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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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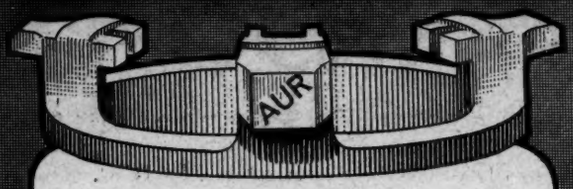

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

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EDITORIAL NOTES.

Benzol and Toluol Production by the Gas Industry for War Purposes.

NOT long since a special article was published by us indicating some of the work that the Dilution Section of the Labour Department of the Ministry of Munitions had done in connection with the gas industry to alleviate the pressure for labour. This week a further special article describes the organization, the work, and the results of the Gas Section of the Department of Explosives Supplies; and this adds another most interesting chapter to the war work of the gas industry. Over the recorded results, and the service rendered to the country and the Allied cause, the industry has every reason to be proud. The fact that there were so many gas-works that continued tar-washing and did not extend their operations to oil-washing shows that the capacity of the industry was by no means exhausted for realizing larger supplies had they been required. From the time the work was taken in hand the pure benzol supplied by the industry amounted to no less than 21,800,000 gallons; toluol, to 8,000,000 gallons; solvent naphtha, to 4,000,000 gallons. As high explosives, the quantity of benzol mentioned represents about 1,200,000 tons of picric acid; the toluol corresponds to something like 65,300 tons of T.N.T. The effect that these destructive agents had in the war and in securing victory was great; how great, can only be imagined, and not defined. The article also includes statistics as to tar and creosote production. The various figures (which are authoritative ones) will not only have historical value, but they will be useful to the gas industry in showing the part it took in providing the country for the greatest of wars with the first of essentials in the munitions for modern warfare. The section was splendidly organized and officered; and the industry will look back with pleasure upon its association with it in the rendering of an indispensable service.

War Time Experiences and Work of Development.

FIRST impressions go a long way; and the first impressions which the proprietors of the Gas Light and Coke Company received last Friday of their new Governor (Mr. D. Milne Watson) were clearly that he was the right man in the right place. The encomiums on the address that were heard from proprietors, and were heartily endorsed by the meeting, are the confirmation. At the address we can perhaps look in a somewhat different light from the ordinary proprietors, and put even greater value upon it than they, shrewd men of business though many of them are. A new atmosphere was introduced into the work and proceedings of the Company by Sir Corbet Woodall. The old autocratic spirit disappeared; and the proprietors were made to feel that they were more part and parcel of the Court of Directors than they had been in the years that had passed. They were invited and encouraged to take a keener interest in the affairs of the Company, and a broader outlook upon the affairs of the gas industry generally. All this has been fully maintained during the comparatively brief tenure of the governorship by Mr. John Miles; and the address of the new Governor gives the promise (as we anticipated it would) that the new spirit will not only be maintained but advanced. The Gas Light and Coke Company occupying the premier position among British gas undertakings, its Governor ought not to be a man circumscribed and obsessed only by its operations. The gas industry generally has a right to look to him, as the occupant of a unique position—a position which gives him unrivalled opportunities for making a wide survey—for light and guidance. The address of Mr. Milne Watson shows that the industry will not be disappointed. He has been schooled in gas affairs not only in the Company, but—as the leading spirit in the old National Gas Council and in the organization of the new one—he has derived a knowledge of the industry which enables him to look beyond the interests of one concern or even of the Metropolitan area, and there find much of common importance which invites co-operative measures on the part of the whole of the industry's units.

This explains the breadth of view and the comprehensiveness of the subject-matter composing the address to the proprietors of the Company. They had their attention directed to matters immediately concerning them; and their minds were also carried away to subjects which bear upon the fortunes of the industry in its entirety, including their own Company. Those who listened with understanding would have gathered that the difficulties of war time are not going to be swept away without leaving traces behind them; that the industry to-day is in a position in which there must be careful handling; that there are problems internal and external which will have to be attacked and solved or watched, and action taken as occasion may require. The inherent strength of the industry is unchanged; as a matter of fact, the war has revealed it in stronger light. But circumspection, courage, and unity are the essentials that are required for dealing with the position. Every gas undertaking has plenty of leeway to make up through the ravages of war time, and a financial position of unprecedented character upon which to work to produce amelioration. Magnitude tells in these matters; and so the administrators of every gas undertaking may take it that bad as they may feel their position in these respects, that of the Gas Light and Coke Company is worse in the total, if not proportionately. Nevertheless these matters are not, the address shows, absorbing attention. The eyes and thoughts of the Governor are not only upon the present but the future. That is, of course, as things should be.

The address was punctuated by illustration such as appeals to those who are not living day by day among the affairs of the industry. How the prices of coal, materials, and labour have affected the Company was shown. These are matters of general knowledge. But the expenditure on materials and labour at their present high figures would have been of immensely larger proportions had war conditions not imposed limitations on the activities of the Company in respect of maintenance, repair, and renewals. Substantial arrears of expenditure in these directions have still to be faced. Just think (taking only one example) what employment there is in 40,000 meters now waiting repair which, in ordinary circumstances, would have been dealt with day-by-day as they were returned from service. With all the heavy increases of expense, there is the fact that secondary products last year only contributed 61 p.ct. to the cost of coal, while in 1913 they contributed 18 p.ct. more—the reduction being partly due to Government restrictions. On the other hand, while prices of materials of all kinds have advanced by the heavy percentages mentioned in the address—variously from 100 to 500 p.ct.—the price of gas has only risen by 73 p.ct. If these facts could be pointedly brought before gas consumers as they are rendered in the address, they would be surprised that the industry has been able to carry on with such a very modest call upon them. At the same time, gas undertakings have been rendering distinguished services to the country; and, now that hostilities have ceased, the curtain is lifted a little upon the contribution the largest Gas Company has made. The men who joined the forces have brought honour

on themselves and on the Company. So have the men who on the Company's colliers have on three occasions shown enemy submarines something of British mettle, against great odds. The raw materials supplied by the Company for explosives purposes were sufficient to fill no less than 160 million 18-pounder shells. Some 17 million gallons of oil were supplied for fuel purposes for the use of the allied navies and munition works. About 13,000 tons of disinfectants have gone from the Company's works. Over 5 million gallons of road tar have been shipped for use in France. And, in addition, there has been the sulphate of ammonia which the Government properly insisted upon being kept at home during the war for fertilizing purposes, though not generous over the controlled payment for it. There has been no profiteering in these things; the Government took good care of that. These are matters that make a notable chapter in the history of the gas industry; for, although the figures quoted refer to only one undertaking, they reflect the immense proportions of the aggregate war work of the entire industry.

These matters of the past are going to influence our fortunes in the future. They must be made to do so. There is the question of finance. It cannot be hoped, with the new financial standards and obligations which change has brought about, to continue to live, progress, and be prosperous without the basis is altered on which the industry's statutory limitations have been founded. The President of the Board of Trade has in effect promised that this matter—not for the gas industry only, but for all statutory undertakings—shall receive the serious attention of the Government. We have the assurance of the Governor that the question is being followed up. Then, again, there is the quality of gas; and, in this regard, he foreshadows the early presentation of a report to the Board of Trade by the Fuel Research Board. It is sincerely hoped that the report will recommend greater liberty. Speaking of gas, a protest was made of the serious injustice that was done to the industry by the last rationing scheme, which resulted, in order to effect economy, in an abandonment of gas-consuming appliances, which it will take time and money to restore before the business is recovered. Freights for coal continue at a height which is not justified by circumstances, and upon this there was also protest; an accompanying piece of information being that the Company are contemplating an increase of their own fleet. In regard to the industry's secondary products, the Governor spoke feelingly; and his words are intended for the eyes of the Government. If the Government are bent upon constructive work for the country, then gas manufacture and the secondary products supply them with a large field in which their encouragement is necessary. Without this, new chemical industries cannot arise that might do so. The gas industry, the Government were told, are willing to do much in this direction; but public-utility undertakings cannot risk money without some assurance of success. The Company lately extended their scientific activities, and they are proposing to further amplify their scientific staff. This is essential to progress—not only for new discovery, but in ensuring the correctness of the routes taken. The encouragement that is desired by the gas industry, there is no wish to deny to the electricity industry; but there will be strong objection to facilities being given to the electricity industry that are not accorded to the gas industry. In this relation, the Governor mentioned the steps that are being taken to lay before the Government the case for gas as the best means of preserving the country's coal supplies, and of providing cheap and convenient fuel for the public.

From all this is seen the mass of work that confronts the industry, and what a comprehensive survey the Governor made of it, though necessarily he had in regard to each topic to be brief. There is the case in his address for a strong and active National Gas Council; and his appeal for unity and support we are confident will only remain unanswered by the inappreciative. Ignoring the elements of our immediate environment, and the work that lies ahead, can only lead to disaster, despite the views of the severely confident as to the sufficiency of present policy and practices. Proof rests with time.

An Ideal and Working Results of the South Metropolitan Company.

THE extraordinary position of affairs in the gas industry to-day (as illustrated by the accounts now being received) cannot be taken as indicative of anything other than of a burden of an almost overwhelming character, which hinders natural progress and development of service. The Chairman (Mr. Charles Carpenter, D.Sc.) and his directorial colleagues of the South Metropolitan Gas Company point this out in their half-yearly report, when they remark that the ever-changing conditions make comparisons with other half years of little value. In other words, what obtained in 1917 has not obtained in 1918; and what then existed is, by the inexorable decrees of the times, fast undergoing further metamorphosis. The conditions formed, and in course of formation, are only the rough elements of what as time passes will become the normal conditions—exactly of what shape or weight cannot be said; but they will have little semblance in degree to the conditions that were in being before war disturbed the ordinary running. However, though comparisons have little value as an expression of manufacturing and trading progress, they do inform the laity as to the accrued difficulties and burdens which impose on the one part reduced dividends and on the other part high prices for gas and other commodities which go to the markets from the gas-works.

During the war, the South Metropolitan Company have rendered invaluable service to the State in several ways; and all honour to them. The Chairman and his colleagues have their own way of doing things; and what they have done is perhaps a good set-off to anything they did not do in pursuing their ideal of maintaining the supply of a standard gas. Here there is covered up a question of policy—a controversial question, which is of importance to the gas industry, and which lately led to a little criticism of action, which is not very often the case where this Company is concerned. The matter is revived in a somewhat ambiguous form in the Directors' report now before us. The paragraph referred to is in the nature of a justification for the Company having done only in part something which other companies did fully, or as far as was practicable, during the war. The Directors remark at the close of the paragraph: "It must be stated "that the Company expressed its willingness to depart "during the war from its practice of supplying gas of stan- "dard quality, if required to do so by the authorities to meet "a national emergency." The Company ought to be grateful to those other companies who, by enabling the authorities to meet the national requirements, allowed them to dispense with the full services in this particular of the South Metropolitan Company, and thus permitted them to continue to live up to the ideal of the Board as to the quality of gas. The part of the paragraph, however, which more particularly strikes us precedes the quotation already made. "The ab- "normally heavy cost of coal," it says, "emphasizes the "urgent necessity of securing the most efficient results from "its carbonization, and justifies the policy of distributing, "through the mains and service-pipes, the benzol contained "in purified gas, in order to satisfy the requirements of the "public for light and heat." Of course, the Company are solely dependent upon coal as a manufacturing material; and in these days of high coal costs, any little shred of economy which can ease the coal bill, while gratifying the desire to realize an ideal, is no doubt regarded as of importance in the Board-room. The paragraph continues: "In this "connection, it may be mentioned that had the Company "reduced the quality of the gas to the standard allowed "under war conditions, its consumers would have required "at least 10 p.ct. more gas to give the same amount of heat, "and they would have had to pay during the six months "an additional amount of not less than £127,474." Now what do the Directors mean by the words "standard allowed "under war conditions?" We presume it refers to the 450 B.Th.U. that was allowed. But oil-washing for benzol would not have reduced the calorific power of the Company's coal gas to anything like 450 B.Th.U., nor would the calorific power have been reduced by 10 p.ct. had the gas been stripped of its benzol. The 10 p.ct. additional consumption is largely assumption, under the conditions of the Company. Many companies with less business than this one, and who have oil-washed for benzol, have had decreases in consumption, not increases. This does not show that the consumers have, in consequence of oil-washing and admixture of water gas with the coal gas, required to use any more gas than before. Take the Gas Light and Coke Company, the Governor (Mr. D. Milne Watson) stated on Friday that "the "gas sent out has averaged 486 B.Th.U. per cubic foot, or "only about 7 p.ct. below pre-war quality;" and the Chief Engineer (Mr. Thomas Goulden) later made the point that the decrease in consumption was also 7 p.ct. We know, too,

that gas engineers have made investigation of householders' accounts, and have not found that their consumption has gone up 10 p.ct. in consequence of benzol extraction, or anything else.

There is another associated point. The Company being tied to coal, they have had to pay proportionately more than other companies per 1000 c.ft. for raw material. Last half year, the gross cost of coal was 36·4d. per 1000 c.ft. For the whole year, a neighbouring company paid for manufacturing materials—coal, oil, and coke—30·18d. per 1000 c.ft.; and the company (as already seen) did not get down to the calorific power "standard allowed under war conditions." It is perfectly true that the South Metropolitan Company in the first half of the past year paid for coal 33d. per 1000 c.ft., so that the average for the whole year would have been less than the 36·4d. for the past six months. But if the Company had been making coal and water gas last half year at a cost for manufacturing materials of 6d. per 1000 c.ft. below what they had to pay for coal only—at the same time procuring a larger quantity of benzol and toluol for the country, for which a price would have been received, but is not here taken into calculation—it would have represented on the 6,507,524,000 c.ft. of gas made, £162,688, which is a figure (subject to adjustments for secondary products, including benzol) that may for interest be contrasted with the £127,474 mentioned in the paragraph as the cost of the hypothetical 10 p.ct. additional gas. So that, had the Company been working the same as other companies—benzol washing with oil, and making water gas—they would have been able to have maintained at any rate some of the difference in price per 1000 c.ft. which before the war they always showed compared with the North of the Thames. By-the-by we see that the Commercial Company—with oil-washing and water-gas making as part of their processes—are reducing the price of gas to 3s. 8d. The Gas Light and Coke Company (whose price was always higher than the South Metropolitan Company, mainly owing to the differing capital circumstances) are now charging the same price as the last-named Company—4s. 4d. They have increased their carry-forward; but the South Metropolitan Company also paying a 3 p.ct. dividend, are short of the amount required by £3729. Circumstances as to price can be imagined where it would pay the consumers to increase their consumption by even as much as 10 p.ct., if really necessary, which is not proved by actual use, whatever the calorimeter may say.

But let it not be imagined that there is any animosity underlying these comments and comparisons. There is nothing but a difference of opinion as to policy in these days of development and change, and of need to realize all available economies to meet accrued and still accruing costs, as well as the demand for gaseous fuel. Coal gas manufacture unaided promises to be the most expensive system. However, for the moment, the main point is, Why have not the customers of other companies who have oil-washed their gas for benzol some indication of the additional consumption that they ought to have experienced according to the dictum of the Directors of the South Metropolitan Gas Company, and which should, according to the same authority, have largely wiped-out the savings which the Coal Controller desired gas consumers to make.

Just a few points regarding the finances and the working. Coal and labour constitute the two principal features of the half-year's accounts; and in this connection the Directors in the report mention that, taking the whole of the year, practically 1½ millions more were paid for coal, freight, and wages. Roughly two-thirds of this was extra for coal and freight, and one-third for wages. The quantity of coal carbonized in the half year was 520,765 tons, or less by 84,021 tons than in the corresponding half of 1917. But for this much reduced quantity, £988,579 was paid, or £67,867 more. The secondary products brought in £539,351, which was an improvement of £12,136, realized by coke making £27,793 extra, from which £15,657 has to be deducted for the lower receipts for breeze, tar and tar products, and ammonia products, due to the smaller quantity of coal carbonized. Subtracting the secondary products income from the payment for coal, the net cost of this was £449,228, or £55,731 more than in the second half of 1917. From the 520,765 tons of coal carbonized, 6,507,524,000 c.ft. of gas were made, which averages 12,496 c.ft. per ton, as compared with 12,318 c.ft. per ton in the second half of 1917. This additional make, of course, helped to reduce the quantity of coal required; but the main cause of the lessened need for coal was a 12 p.ct. falling-off in gas demand, chiefly due to the fuel and lighting rationing regulations of the Coal Controller. The total sale of gas was 5,926,848,000 c.ft., or less by 816,704,000 c.ft. than in the December half of 1917. Of this difference private consumption was less by 775,015,000 c.ft., and public lighting by 41,689,000 c.ft. The total income from gas sold was £1,177,372, or more by £181,250—this, in view of the reduction in demand, being explained by the price in the first three months being 4s., and in the second three months 4s. 4d., or 1s. 3d. more than in the second half of 1917. Rents of meters, stoves, fires, and fittings receded by £16,728 to £110,057. This is a big drop, on which no doubt the Chairman will have something to say at the meeting to-morrow. The total revenue amounted to £1,828,571, which is more by £176,878 than in the second half of 1917. The total expenditure was £1,674,487, or an increase of £169,303; so that the balance of £154,084 is more by £7575 than in the corresponding half year. It is interesting, in conclusion, to notice that the sum paid to the employees as wages during the six months was £576,043; and this, added to the cost of coal, makes £1,564,622, which is upwards of 85 p.ct. of the total revenue, and 93 p.ct. of the total expenditure. How can these two charges best be reduced per ton of coal handled? The answer perhaps will be found in the increase of saleable products per ton.

Need for Regaining Sound Financial Conditions.

ONE of the first things the new National Gas Council will have to do will be to consider what steps shall be taken to re-establish the financial position and prestige of the gas industry. It is a matter that cannot afford to wait till the expiration of the two years after the war, which is the duration of the life of the Statutory Undertakings (Temporary Increase of Charges) Act. Gas stock and share holders will be greatly disappointed if they do not see a move made before then—in fact, the fast-growing adverse conditions will not permit of procrastination, for these adverse conditions will (as they now stand) come with a fell swoop upon gas capital at the end of the two years, unless something is done to avert such a catastrophe. We must look forward, as well as give attention to the present. The exiguous dividends that gas capital is under the Act receiving are unsatisfactory to the holders, and positively baneful to the industry. The credit of the industry has been thrown violently backward through inappreciation (confessed by their acts) first of a Select Committee and then of Parliament of the most elementary principles of economics; and this credit must now be restored. It is possible for those with statutory power to issue redeemable debenture and preference stocks at high rates of interest; but money so raised is only a convenient bridge. It does not do anything to restore the opportunities for raising capital at a cheaper rate, nor does it do anything to reinstate to former rank the confidence and satisfaction of the investors—large to small—in gas supply. The quicker both are restored, the better. The industry is talking of taking a large part in the reconstruction work of the country. There is a definite movement towards schemes for development in both domestic and industrial business. Everything invites the gas industry to get more out of the coal it uses, and to permit the extended use of gas, on the most economical terms possible, by the community and by industry. The trend of technical opinion and action is distinctly towards making hearty response to the invitation. But dissatisfaction and a deteriorated confidence in the investment world, together with dear capital, will be obstacles to a full-measured response. Something must be done, and that early, to improve upon the present financial conditions of the industry.

The National Gas Council are not unmindful of the need. The recently issued minutes of the proceedings of the Executive Committee of the moribund Council announced that, it having been reported to them that the work of the Industrial Transition Committee of the War Cabinet Demobilization Committee had been placed under the supervision of Sir Eric Geddes, the Executive Committee had asked Mr. Jacques Abady to investigate and report upon the proposals of the Government for the relief of other industries suffering financial difficulties. This report, when it comes along, should be interesting, and may serve as a guide out of the gas industry's financial afflictions. These are, however, peculiar to the gas industry. Neither in kind nor on the same level can any other industry point to like difficulties;

and, therefore, if Parliament and the Government Departments dealing with reconstruction and the means of revivifying the industrial and trading life of the country are in earnest, they ought to begin by relieving the industry that has suffered the most austere of financial trouble—attributable to the war, and to fresh burdens arising from it. The industry has a strong case of its own; and the earlier its position is reviewed by an authorized, independent, and competent tribunal the better.

The sliding-scale is with the major part of ordinary gas capital in abeyance to-day; and it is not the slightest use for the purpose of raising new capital in these times. The conditions are not attractive enough. Those who possess sliding-scale capital, and cannot afford to buy (say) 6 p.ct. interest bearing preference or debenture bonds, are seeing new investors coming into the business, and taking from it the high rate of interest, while they themselves, having helped to make the business what it has been, have to be satisfied with 3 p.ct. or less. However, that by the way. The sliding-scale, it has been said, was based upon the theory that movements in costs would be within reasonable limits, and that management was the thing that would count most of all, in the rise and fall of gas prices away from the datum-line. This theory has been absolutely destroyed; and now management finds itself almost immovably fixed between monstrous costs and the inflexible decrees of Acts of Parliament. Both sliding-scale and maximum price terms require altering in company with an extension of operating liberty. The former is important, because if the terms have reduced the reward of present capital to something that suggests impoverished profits, this is a condition that will not attract new capital to the industry. The latter is equally important, because the industry has to do the best it can to alleviate the new cost impositions of the times. This will be impossible without loosening the restrictions that ancient knowledge and misconception have lavishly placed upon the industry. To deny the greater freedom would be an economic error. To deny it, too, would be to refuse the community and the industry their right to expect gas men to utilize every increment of technical knowledge and managerial ability to mitigate the effects of increased costs, to which increase labour is working to give a stability which was not reckoned upon when the proceedings were taking place leading up to the Statutory Undertakings (Temporary Increase of Charges) Act. The Select Committee concerned sought public approbation by recommending a skeleton minimum dividend allowance, and at the same time made pretence at serving the industry by expressing a desire to do this to maintain its financial stability! The performance brought forth ridicule; and it was mischievous to the public —not only to the investing part of it, but to the millions of the community and the country's industries to which the development of the gas industry on the soundest of lines means the most economical service. The industry is fettered to-day not only by low financial conditions, but by the solid increases of cost which, instead of showing a tendency to decline with the end of hostilities abroad, evince a clear intention to become greater by labour hostilities and errors at home. Householders and industries are aware that a higher standard of wages means a higher standard of cost for commodities, unless production increases to an extent to supply compensation. The commodities supplied to, and required by, the gas industry are much dearer, and will be more so; and therefore the consumers of gas will have to reckon on paying accordingly. This cannot be helped; but what can be helped is that, Parliament sensible and willing, financial and other statutory conditions should be such that the gas industry can make the best of current circumstances, whatever their nature. It is not part of the functions of the Legislature to put upon the industry, or to keep upon the industry, conditions whichoffer resistance to the best public service.

What is Wrong with the Gas Industry?

This is the question at the top of an article in other columns, written by an "Occasional Contributor." We think the answer is that the industry has not yet provided itself with a settled programme on which to work. Everybody realizes that there is plenty of work at hand, but that is about as far as we have got in giving it definite shape and place. However, the reconstituted National Gas Council will be commencing operations this month; and the combined brain power of the industry should then be available for formulating a programme and policy. "Occasional Contributor," in the course of his argument and suggestion, asks why, if the National Gas Council was necessary, it was not formed before infinite harm had already been caused to the stability of the industry? We cannot answer the question as it is rendered, seeing that stronger organization has been a conspicuous subject in the "JOURNAL" for many years. But the "if it was necessary" implies a doubt. It was necessary because the existing organizations were not independently sufficient to prevent harm being done to the industry.

The Price of Gas and Wage Payments.

An extremely interesting point was made by Mr. R. J. Neville Neville in his address to the proprietors of the Brentford Gas Company, as reported in this issue. By some means or other, he has calculated the total amount paid to labour out of the charge for gas—not to gas workers only, but to any labour involved in producing coal and the other materials required by the undertaking. He finds that the total wages paid on the turnover (which last year was £971,669) was £615,000, which is equal to 3s. 3d. per 1000 c.ft.—thus leaving only 9d. out of the present charge of 4s.. We do not quite see how Mr. Neville arrived at this proposition. Last week, it was shown in the "JOURNAL" [p. 209] that Sir Eric Geddes had, in dealing with co-partnership, stated that labour in gas-works took roughly 30 p.ct. of the expenditure; in coal mining, 73 p.ct. of the cost of production; and on railways, 65 p.ct. of the expenditure. But if Mr. Neville took these percentages, how did he find out what was the cost of production (say) of coal? The expenditure at the pit is not the price paid by the Brentford Gas Company. The price paid, too, for other materials is not the expenditure upon their production. We may perhaps be a little inquisitive; but before accepting them we should like to know something as to the nature of the foundation for these estimates.

B.Th.U.—450 or 550?

By yesterday morning's post, we received from a contributor an article in which he sets out reasons for maintaining the calorific quality of gas as against dropping to 450 B.Th.U., and thus denying the gas industry the advantages of economies producible by steaming or water-gas use. Coming late, we have not had time to study the contribution; but nevertheless publish it at once, as the writer is a man holding a distinguished position in the gas industry. We may just remark here that the old normal conditions have disappeared in relation to coal, labour, and other materials. We remember the piles of coke that cumbered gas-works yards before the war; and we are warned that the fertilizer market is not likely to be as of old. The economic position for gas undertakings is a polyphased one; and it requires very serious consideration from every standpoint.

The Labour Troubles.

Sections of labour, debauched by State money and encouraged by the timidity of the Government in dealing with extravagant demands during the war, have in the course of the past week been busy producing social disorder and putting the country's work to all sorts of inconvenience in the attempt to arrogantly enforce compliance with their wage and hour excesses. Two main railways have had their services largely stopped, and the means of subterranean conveyance about the Metropolis have been entirely closed-down. The big Lots Road generating station, which supplies energy to a large railway system, has been unemployed; and there were threats to cut-off the whole of the electric supply to London. Some of the outside electrical men were actually brought out; but the Government have displayed more vigorous action in dealing with this product of their own prior weakness, by evoking the aid of "D.O.R.A.," and bringing to bear Section 4 of the Conspiracy and Protection of Property Act, as well as the section of the Electric Lighting Act of 1882, which enacts that any person who unlawfully or maliciously cuts or injures any electric light or work, or acts with the intention to cut-off any supply of electricity, shall be guilty of felony, and be liable to be kept in penal servitude for any term not exceeding five years. The prospect of this had a repressing effect on the ardour of the men who, to gain their own selfish ends, would have brought more misery to countless people. There was also a threat to hold-up the whole country by calling-out the drivers on the other railways. This particularly

malicious proposal was averted for the time being; but discussion is to be resumed to-morrow of details associated with the railway eight-hour day, and with pay under certain conditions. What the result will be cannot be predicted. The trouble at Belfast still continues; while the Clyde men, thanks to the firm action of the Government, in refusing to intervene (except to maintain order) in unauthorized strikes, and so properly defending trade unionism, are filtering back to work. There have been local strikes in certain coalfields, and considerable output lost. Discussion has been proceeding regarding the demand for an additional 10s. per week for gas workers; and the National Federation of General Workers responsible for this claim are also pledged to the policy of a forty-four hour week.

Coal Stocks and a Critical Week.

The dislocation of railway services has worsened the coal position. Much-wanted deliveries to gas-works, with the extra pull upon them for gas owing to the cold weather, have been delayed; and the trucks that should have been back at the collieries have been stranded. Other industries have also suffered like inconvenience; but there is a callous indifference on the part of the men (or those who incite to strikes) as to the far-reaching effects of their reprehensible action. If the interests of the country were considered, and wage advances were based on increased production and prosperity, the men should be eager to work reasonable hours, and help forward a condition of things that would contribute the means for raising pay. The gas company accounts that are now coming in show that coal stocks are deplorably low compared with a year ago, with the demand for gas for heating purposes at a high level. At the time the last list of gas-works having low stocks was issued by the Coal Controller, there were 19 works with less than three days' stock in hand, 74 with less than a week's stock, and 97 with less than two weeks'. If there is further trouble in the coalfields, or on the part of railway and transport workers, the position will become still more precarious, and for a larger number of works. And to-morrow is a critical day. Not only will the embroidery of the eight-hour railway day then be the subject of discussion, but the transport workers will be considering their wants, and the Miners' Federation are also meeting to discuss their national programme, including the 30 p.ct. additional wages, the six-hour working day, and the payment of full wages for demobilized and other miners during unemployment. It is calculated that the shortening of the miners' day and the advance of wages will represent an increase of 55 p.ct. on the cost of production. Coal is wanted badly; and there is plenty of employment, without further reducing hours, if only all sections of workers in the industrial system would help to create it by doing their individual parts by giving a fair day's work for a fair day's pay. Readers may be reminded that the miners and railway and transport workers are federated together, so representing a triple alliance, with 1½ million members.

Benzol Distribution.

There is a chatty article in "Motor" on the subject of the sale and distribution of benzol. The writer is "J.H.S.," who, it is said, is prominently connected with plant capable of dealing with 10,000 gallons of benzol per day. This gentleman is full of good-natured advice on subjects which are already items of the programme of the National Benzol Association, and are coming immediately under the consideration of the members. He suggests that benzol should be thoroughly washed (the producers must not be afraid to use a little more sulphuric acid and caustic soda), as the sulphur must be reduced; and they must also adopt a standard suitable for motor engine purposes. In these matters there is perfect agreement. One on which there is not agreement is that "J.H.S." appears to be strongly in favour of the petrol people taking over the distribution of benzol. This they have already offered to do; but, it is said, the National Benzol Association have other views. The question of distribution for motor use, our counsellor believes, is going to be a hard nut for the benzol producer to crack. On the other hand, the Automobile Association are opposed to the home-produced fuel being manipulated and controlled by the petrol suppliers. They prefer competition, with, if anything, a leaning on the part of users in favour of the home-produced motor fuel. "J.H.S." urges that distribution efficiency is as important as competition. There are gas-works in every city and town in the country that can very efficiently distribute benzol—just as they do coke, tar, and sulphate of ammonia; and they are in touch with local traders. So far as we can see, there is no need for benzol to get into the hands of middlemen; the retailer can deal direct with the producers. The coke-oven product may in cases be off the beaten track; but the National Benzol Association will know how to manipulate this part of the production. The petrol people are extremely anxious to get control of benzol. For what purpose? The benefit of the producers, motor car users, or themselves? It is known that already they have bought, and are buying, benzol in large quantities. Meanwhile "Motor" learns that the tax on benzol has been expressly remitted for the purpose of enabling producers to organize adequate methods of distribution. Our contemporary is given to understand that, if the producers allow the distribution to drift into the hands of the petrol concerns, instead of organizing methods themselves which will keep the home produce under separate control, there will be an end to what is in effect a temporary subsidy.

The Helps-Carr Challenge.

It seems there is to be no development of the regrettable incident that took place at the last meeting of the Manchester Institution, when Mr. Isaac Carr, in the heat of debate, accepted a challenge, with a monetary penalty attached to it, made by Mr. George Helps, who contends that 350 B.Th.U. gas can be made to give as good efficiency as 500 B.Th.U. gas. Mr. Carr has desired to abide by his hastily made acceptance of the challenge; but, as the correspondence which is published in this issue discloses, while he wished to leave unconditionally the whole matter to an independent tribunal (the Committee of the Manchester Institution) to make the necessary arrangements for the tests, Mr. Helps had other views, and so an impasse has been created. The President of the Manchester Institution (Mr. J. P. Leather) has therefore returned the cheque for 100 guineas sent to him by Mr. Carr, and, in his covering letter, the President remarks: "In view of the attitude adopted by Mr. Helps, as revealed in the letters to you, the Committee are unable to take any action, although they are of opinion that such attitude is altogether unreasonable." The conditions that Mr. Helps desired to impose will be gathered from the correspondence.

Production of Energy.

Dealing with this subject, "De Ingenieur" for Dec. 14 points out that coal used for producing gas returns nearly 70 p.ct. of the calorific value of the fuel in the form of gas, tar, and coke, and yields, in addition, valuable bye-products, while coal directly fired under steam-boilers for producing electricity only yields about 13 p.ct. of the calorific value in the form of electric current. The author comes to the following conclusions:

i.—The direct use of coal for heating is not economical.

ii.—Gasification of coal is the most economical method, as a number of bye-products, more valuable than the fuel itself, are obtained.

iii.—In projecting large steam-driven power stations, the aim should be combination of industries in such a manner that the exhaust steam is fully utilized.

iv.—The third point should be prominent in all electric projects for Holland in order that a total efficiency of not less than 80 p.ct. of the heat value of the fuel may be obtained.

v.—The exhaust steam from existing large steam-driven installations should be utilized by industries that require steam heating—such as artificial silk factories, laundries, sugar refineries, beet-sugar factories, &c.

vi.—The Government should advise on the efficiency of all coal-burning plant, and ultimately control same.

vii.—Existing gas-works are best suited for preparing coal for use in power stations.

At a meeting of the Yorkshire Junior Gas Association, in the Leeds Institute, next Saturday afternoon, Mr. H. Rhodes, of Bradford, will read a paper on "Some Distribution Troubles."

The late Mr. John Ewart, of Limpsfield, Surrey, a Director of the South Metropolitan Gas Company, whose death at the age of 71 was recorded in the "JOURNAL" for Nov. 19, left estate of the gross value of £17,207.

The annual meeting of the Manchester District Institution of Gas Engineers has been fixed for Saturday, the 1st prox., at 2.30, at the Midland Hotel, Manchester. Mr. A. E. Mottram, of Ossett, will then deliver his Presidential Address.

The Fuel Economy Committee of the Institution of Heating and Ventilating Engineers have prepared a pamphlet, copies of which can be obtained free on application to the Board of Trade, Coal Mines Department, Holborn Viaduct Hotel, London, E.C. —quoting reference No. 2006/SR/2.

NATIONAL GAS COUNCIL OF GREAT BRITAIN AND IRELAND.

Electing Office-Bearers, &c.

The following meetings have already been held for the election of office-bearers, &c., in connection with the reconstituted National Gas Council. Other district meetings will take place this week.

IRELAND.

The meeting of the District Executive Board for Ireland, was held in Dublin, on Monday of last week. The following appointments were decided upon, subject to confirmation by a full meeting to be held at a later date:

DISTRICT EXECUTIVE BOARD.
Mr. H. W. SAVILLE, Drogheda, Chairman.
Mr. GEORGE ANDERSON, Queenstown, &c., Vice-Chairman.

CENTRAL EXECUTIVE BOARD NOMINEES.
Mr. W. J. SKEFFINGTON, Drogheda.
Mr. J. D. SMITH, Belfast.
Mr. R. BRUCE ANDERSON, Queenstown, Waterford, &c.
A representative from Dublin.

MANAGEMENT COMMITTEE.

Mr. GEO. W. ANDERSON.	Mr. W. T. SKEFFINGTON, Drogheda.
Mr. R. BRUCE ANDERSON.	Mr. H. W. SAVILLE, Drogheda.
Mr. JAMES JACKSON, Larne.	Mr. J. D. SMITH, Belfast.
Mr. WM. J. JOHNSTON, Larne.	A representative from Dublin.
Mr. GEO. AIRTH, Dundalk.	

With power to add to their number.

SECRETARY, Mr. GEORGE AIRTH, Dundalk.

MIDLAND DISTRICT.

The Midland District Executive Board and Separate Committee of Employers met at Birmingham last Thursday, when the undermentioned appointments were made:

DISTRICT EXECUTIVE BOARD.
Mr. A. W. SMITH, Birmingham, Chairman.
Mr. G. STEVENSON, Long Eaton, Vice-Chairman.

REPRESENTATIVES TO ACT ON CENTRAL EXECUTIVE BOARD.
Mr. HUBERT POOLEY, Leicester.
Mr. FERGUSON BELL, Derby.
Councillor W. F. CHARLES, Loughborough.
Mr. JAMES PATERSON, Cheltenham.

SECRETARY TO DISTRICT EXECUTIVE BOARD.
Mr. S. TROW SMITH, Malvern.

MANAGEMENT COMMITTEE.

Mr. HUBERT POOLEY, Leicester.	Mr. L. E. CLIFT, Redditch.
Mr. J. FERGUSON BELL, Derby.	Mr. Alderman T. MITCHELL, J.P., Stoke-on-Trent.
Councillor CHARLES, Loughborough	Mr. JOHN WILKINSON, Nottingham.
Mr. JAMES PATERSON, Cheltenham.	Mr. W. M. VALON, Stafford.
Mr. R. J. MILBOURNE, Wellington.	

Mr. A. W. SMITH and Mr. G. STEVENSON, *ex-officio*.

SEPARATE COMMITTEE OF EMPLOYERS.

Alderman ALBERT BALL, J.P., Nottingham, Chairman.
Mr. H. E. COPP, Staffordshire Potteries, British Gas Light Company, Vice-Chairman.

REPRESENTATIVES ON CENTRAL COMMITTEE.

Alderman ALBERT BALL, J.P., Nottingham.	Mr. R. J. MILBOURNE, Wellington.
Mr. H. E. COPP, Staffordshire Potteries.	Mr. A. W. SMITH, Birmingham.

SECRETARY TO COMMITTEE OF EMPLOYERS.
Mr. C. H. CARDER, Oldbury.

MANAGEMENT COMMITTEE.

Mr. R. J. MILBOURNE, Wellington.	Mr. C. M. D. BELTON, Shrewsbury.
Mr. A. W. SMITH, Birmingham.	Councillor J. BROWN, Sedgley.
Mr. J. FERGUSON BELL, Derby.	Mr. JAMES PATERSON, Cheltenham.
Mr. WM. WILSON, Burton-on-Trent.	Mr. ALEXANDER MACKAY, Stoke-on-Trent.
Mr. C. H. WEBB, Stourbridge.	

Alderman ALBERT BALL, J.P., and Mr. H. E. COPP, *ex-officio*.

NORTHERN DISTRICT.

The meetings of the Northern District were held at Newcastle-on-Tyne, on Friday; and the appointments were as follows:

DISTRICT EXECUTIVE BOARD.
Mr. T. HARDIE, Newcastle, Chairman.
Mr. N. COX, Sunderland, Vice-Chairman.

REPRESENTATIVES APPOINTED TO CENTRAL EXECUTIVE BOARD.

Mr. F. P. TARRATT, Darlington.	Mr. A. W. BRANSON, W. Hartlepool.
Mr. N. COX, Sunderland.	Mr. H. LEES, Hexham.

Secretary—Mr. H. LEES.

MANAGEMENT COMMITTEE.

Mr. T. P. RIDLEY, Newcastle.	Mr. A. W. BRANSON, West Hartlepool.
,, C. DRU DRURY, Sunderland.	,, F. C. WILLIS, Tynemouth.
,, F. P. TARRATT, Darlington.	,, A. B. WALKER, Walker & Wallsend.
,, H. LEES, Hexham.	,, J. KELLY, Bridlington.
,, R. NELSON, East Hull.	,, J. E. BLUNDELL, Carlisle.
,, H. CLAPHAM, Redcar.	
,, S. SHADBOLT, South Bank and Normanby.	

Mr. T. HARDIE and Mr. NORMAN COX *ex-officio*.

NORTHERN SEPARATE COMMITTEE OF EMPLOYERS.

Mr. T. HARDIE, Newcastle, Chairman.
,, N. COX, Sunderland, Vice-Chairman.
,, H. LEES, Hexham, Secretary.

REPRESENTATIVES ON THE CENTRAL COMMITTEE.

Mr. T. HARDIE, Newcastle.	Mr. H. LEES, Hexham.
,, N. COX, Sunderland.	,, F. P. TARRATT, Darlington.

MANAGEMENT COMMITTEE.

Mr. T. P. RIDLEY, Newcastle.	Mr. A. W. BRANSON, West Hartlepool.
,, C. DRU DRURY, Sunderland.	,, F. C. WILLIS, Tynemouth.
,, F. P. TARRATT, Darlington.	,, M. DUNN, Stockton-on-Tees.
,, H. LEES, Hexham.	,, J. KELLY, Bridlington.
,, R. NELSON, East Hull.	,, J. E. BLUNDELL, Carlisle.
,, H. CLAPHAM, Redcar.	
,, S. SHADBOLT, South Bank and Normanby.	

Mr. T. HARDIE and Mr. NORMAN COX, *ex-officio*.

DETERMINATION OF MOISTURE IN GASES.

At a Meeting of the Manchester Section of the Society of Chemical Industry at the Grand Hotel, Manchester, last Friday, a note on a "Device for Measuring Small Quantities of Moisture in Gases," by Messrs. A. J. Crockett, M.Sc., and R. B. Forster, D.Sc., was communicated by Dr. Forster. The instrument in question, said the speaker, had been devised more particularly for rapidly estimating small quantities of moisture in ethylene; but he believed that it might also be applicable to producer gas, and for other purposes. The principle of the apparatus depended upon the well-known expansive properties of fibres with increase in moisture; and Chardonnet silk had been adopted as the most suitable material. The apparatus itself was made of metal, and was placed in a bell-jar fitted with a wide glass tube, to the upper end of which was attached a rubber stopper through which the gas inlets and outlets passed. One end of the fibre was fitted to an adjustable hook at the top of the instrument, and the other to the short arm of a magnifying lever. The long arm of the first lever was connected with the short arm of a second lever, the long arm of which was attached to a pointer moving in front of a scale. The elongation of the Chardonnet silk fibre was thus magnified, so that one scale division represented a variation in moisture content of about 0·05 p.ct.

Steam-Boiler Plants and Economizers.

Pointing out that very little information has been published as to the actual figures being obtained in the practical running of boiler plants, and the saving to be effected by the adoption of more up-to-date and scientific methods than are at present in vogue, Messrs. D. Brownlie, B.Sc. Honours (Lond.), F.C.S., J. Compston, and H. W. Royse set themselves to reduce this gap in general engineering knowledge by the preparation of a series of articles on different sections of the subject. These articles are to contain data based on ten years' continuous experience in investigating and reorganizing steam-boiler plants in all parts of Great Britain, and will treat in more complete detail the figures for the performance of 250 typical steam-boiler plants in 27 different industries. A reprint has been received of the first article, which appeared in "Engineering" on Nov. 1 last. It deals with the subject of economizers, which are briefly described as consisting essentially of a series of vertical cast-iron tubes placed in the hot exit gases from the boilers, and so arranged that the boiler-feed water passes through the tubes on its way to the boilers. Of the 250 plants specially referred to, only 155 were fitted with economizers; and the average saving obtained by them was 11·4 p.ct. of the coal bill. If installed on correct lines, however, the authors say that the saving effected by economizers should be from 17½ to 20 p.ct. Other advantages of the economizer are pointed out; and then the disadvantages attaching to it are fairly dealt with. To sum up, they calculate that the total amount of coal burned per annum in boilers for the generation of steam in the whole country is probably 75 to 100 million tons. On the 250 plants, the saving due to economizers averaged only 7·1 p.ct., including the 95 plants not fitted with economizers; and this figure may, pending further information, be assumed to be correct for the whole country. As an economizer working on efficient lines will save (say) 17½ p.ct. of the average coal bill, if all the boiler plants in the country are made up-to-date in this respect, and the saving increased from 7·1 to 17·5 p.ct., the net saving would be 10·4 p.ct. This would correspond to no less than (say) 7 to 10 million tons of coal per annum, if the economizers were installed on correct scientific lines.

PERSONAL.

The many friends of Alderman THOMAS CANNING, J.P., of Newport (Mon.), who is now 70 years of age, will be glad to learn that he is recovering from his recent indisposition.

Readers will learn with regret that the Glasgow Corporation Gas Committee have had to grant Mr. ALEXANDER WILSON three months' leave of absence, in order that he may undergo an operation on his eyes. Mr. RALPH HALKETT, the Assistant General Manager, takes control of the undertaking until Mr. Wilson's return.

Lieutenant NORMAN STEWART DOUGALL, R.A.F. (the son of Mr. J. S. Dougall, the Engineer, Manager, and Secretary of the Boston Gas Company), has been awarded the Croix-de-Guerre, with Palms, for distinguished service. The French official announcement says that he executed a number of bombardments at great distances behind the enemy's lines, and has often attacked ships at sea. An experienced and courageous observer, he has always served as an example to other officers of the Squadron.

A list of recently elected members of the Society of Chemical Industry includes the name of Mr. HAROLD STANIER, of the Chemical Laboratory of the South Metropolitan Gas Company.

Lieutenant HAMILTON YUILL, R.A.F., son of Mr. Alex Yuill, of Dundee, had an accident last week, while flying in the neighbourhood of St. Albans. He was removed to hospital, and the latest report was that he was progressing favourably.

OBITUARY.

News was received yesterday of the sudden death, from pneumonia, of Mr. ANDREW MACKENZIE, a Director of Messrs. Alder and Mackay, Ltd. Well known throughout the profession, and much respected, he will be greatly missed. It is only about fifteen months since we had the pleasure of recording the fact that he had been made a member of the Board of the business with which he had been associated for nearly forty years—for 37 years of which he was the firm's Chief Representative. Mr. Mackenzie was a Director of the Oban Gas Company, and an extraordinary member of the North British Association of Gas Managers.

The death took place last week, at the age of 82, of Mr. J. W. CORNISH, who for 65 years was in the service of the Plymouth and Stonehouse Gas Company, and for a long period was cashier at the works. He retired in 1917, and was presented by the employees of all departments with an illuminated address. The funeral on Tuesday last was carried out with Masonic rites; Mr. Cornish having been an ardent Mason.

The death has occurred of Mr. FRANCIS COOPER, the Chairman of the Shanklin Gas Company. He had been a Director of the Company for 36 years, for a quarter-of-a-century of which period he had occupied the chair. In the report for the past year, reference is made to the death also of Mr. RICHARD YOUNG, who had been a Director of the Company for 32 years, and for 13 years was Deputy-Chairman.

Mr. CLEMENT TILDESLEY, whose death is announced, was for a period of more than thirty years Chairman of the Willenhall Gas Company.

The death is announced of Mr. THOMAS WRIGHT, late General Works Manager of the Dowson-Mason Gas Plant Company, Ltd., of Levenshulme, Manchester. Mr. Wright had been for many years recognized as an expert in the construction of coal and gas-fired furnaces; and his loss will be severely felt. He was a member of the Institutions of Civil and Mechanical Engineers, and of the Iron and Steel Institute.

Low Temperature Coking Processes in Germany.

According to the "Chemiker *Zeitung*" of Dec. 18, systematic investigation is being carried on, and important discoveries are being made in Germany in connection with the products of coking coal at low temperatures. German manufacturers have not been slow to perceive the possibilities lying in this direction. A writer in one of their technical journals, after describing the work that is being done in Great Britain, appeals to his countrymen not to let this promising development of a vital industry pass out of their hands. He tells them that the importance of low temperature processes, with their many products, to German industry in the immediate future calls imperiously for a free exchange of experiences as in England. The hearty co-operation of scientists and manufacturers should be brought about, he maintains—assisted, if necessary, by the Government; so that, putting aside trade secrets and avoiding dissipation of energy, a united effort may be made to approach the question from several sides, and to work systematically for a solution of its problems.

Commercial Gas Company's Reduction in Price.—The Directors of the Commercial Gas Company, at their meeting on Thursday last, decided to reduce the price of gas from 4s. 2d. to 3s. 8d. per 1000 c. ft., as from the taking of the meter-indices for the Christmas quarter.

INSTITUTION OF GAS ENGINEERS.

Council Meeting, Feb. 6.

A MEETING of the Council was held at No. 39, Victoria Street, Westminster, on Thursday last—Mr. SAMUEL GLOVER (President) in the chair.

It was decided that the annual general meeting should take place on Tuesday, Wednesday, and Thursday, May 27, 28, and 29. A letter was reported from the Société Technique de l'Industrie du Gaz en France suggesting an interchange of visits to the annual meetings. A reply had been sent by the President expressing appreciation of the idea, and conveying an invitation to members of the Société Technique to the Institution's annual meeting. It is hoped that many members will take this opportunity to visit France, and join with our allies at their meeting, which will probably be held in one of the re-conquered towns of Alsace Lorraine.

The President reported the correspondence he had had with Mr. H. Townsend, of Wakefield, with reference to information the latter is collecting in regard to damage to gas-works during the war. It was resolved that Mr. Townsend be asked to present this in the form of a paper at the annual general meeting, and that this intention be communicated to the French, Belgian, and Italian Gas Institutions with a view of interchange of experiences. It was decided that a notice be inserted in the Technical Press asking engineers of English gas-works to forward any information of damage at their works for Mr. Townsend to include in his paper.

The death of Mr. W. E. Pettigrew, of Leeds (an associate member), was reported, and the sympathy of the Council was expressed with those who have been bereaved.

Reference was made to honours which had been received by members of the Institution (as follows); and the Council directed that congratulations should be conveyed to them on behalf of the Institution:

Prof. J. W. Cobb, C.B.E., for services in connection with the war.

Lieut.-Colonel G. S. Eunson, T.D., appointed a Deputy-Lieutenant of the County of Northamptonshire.

Mr. Thomas Curr, O.B.E.

Applications for membership were received from the following, who were approved as candidates for the next ballot for the class of member:

William Collins, Engineer and Manager, Gas-Works, Coquimbo, Chili.

David Vincent Hollingworth, Manager of the Coke and Bye-Products Works, Birchenwood Collieries, Kidsgrove.

Arthur Lake Jennings, Engineer and Manager of the Spenborough Gas Department.

The four representatives of the Institution on the Central Executive Board of the National Gas Council were appointed: The President for the time being, the two Vice-Presidents, and the Honorary Secretary.

The resignation of Mr. Ralph Halkett, of Glasgow, as Examiner in Gas-Fitting at the City and Guilds of London Institute examinations was received with regret. It was unanimously resolved that Mr. H. Kendrick, of Stretford, be recommended to the Department of Technology for the position.

The report of the Life of Gas-Meters Committee was presented. This included a decision with regard to the standard form of guarantee which had been referred to the Committee by the National Gas Council. It was resolved to recommend that the following paragraph be added to the standard form of guarantee adopted in 1918:

> The above guarantee refers to dry meters only; the original five years' guarantee with respect to wet meters being continued.

The report of the Finance Committee was accepted and adopted, including the accounts for the year ended Dec. 31 last.

The progress of the work of the Refractory Materials Committee was reported by Mr. J. P. Leather, the Acting Hon. Secretary. It was decided to make application to the Advisory Council of Scientific and Industrial Research for a grant for the year 1919. Mr. Leather informed the Council of the work of the newly-formed Association for Refractories Research, and of the relationship of the Institution Committee to the Association.

The draft report of the Metric Committee of the Conjoint Board of Scientific Societies was presented; and it was decided to draw this Committee's attention to the fact that the introduction of coins of different size would involve much cost to the gas industry for a considerable time, owing to the millions of meters worked by coin of the size and value of one penny.

The Empire's Mineral Resources.—The Imperial Mineral Resources Bureau, formed at the suggestion of the Imperial Conference, has appointed a governing body consisting of representatives of the Home Government, the Dominions, India, and the Colonial Office, while six representatives of the mineral, mining, and metal industries were appointed by the Minister of Reconstruction. Committees have been set up to deal with intelligence and publications, research and development, legal matters, and general purposes and finance. Offices have been taken at No. 14, Great Smith Street, Westminster; and the advice of all interested is sought.

DEPARTMENT OF EXPLOSIVES SUPPLY.

HISTORY OF THE WORK OF THE GAS SECTION.

THE object of this section was originally to obtain the maximum recovery of toluol from the coal carbonized at gas-works. From a very small beginning the section grew steadily and increased its activities, till finally these comprised, besides the recovery of benzol and toluol, the maintenance of an adequate supply of gas to munitions works, which entailed the consideration of labour questions affecting gas-works, allocation of gas oil, and consideration of applications for priority for gas-works and tar-works plant, together with the following-up of contracts resulting from these. The control of tar production for fuel oil and the licensing of tar sales were also undertaken.

Mr. F. L. Halford has been directing the work of the Gas Section from its inception, and has been assisted by Mr. W. Doig Gibb, as Technical Adviser, and by Dr. Harold G. Colman, as Chemical Adviser. A feature of the section throughout has been the fact that its staff was almost entirely composed of technical men and men familiar with gas-works matters. This has enabled every item to be thoroughly considered from the point of view of the industry as well as from that of the Ministry of Munitions. Much assistance has been given by the section's technical staff in the operation of benzol plants, and also in connection with applications for priority, extensions, and other matters. For a considerable time, the section has been responsible for the supply of gas to munition works, and has been able to give a great deal of help in this direction.

TOLUOL.

One of the first steps was to stop all forms of waste of toluol. For this purpose, the Road Board agreed to bring pressure upon all local authorities to use only refined tar for road purposes. A system of inspection of tar dehydration plants was also instituted, by which much waste was avoided. Since from the carbonization of coal only a small proportion of the toluol remains in the tar, and probably on a average 80 p.ct. goes forward in the gas, it was decided to negotiate with some of the larger gas-works with a view to the introduction of oil-washing. In view of the effect on the illuminating power of the gas—much greater than that on the calorific value—it was decided that the gas at the works where plants were to be erected should be carburetted with the benzol recovered in the course of toluol extraction, together with such an additional amount as would replace the toluol recovered.

Agreements on these lines were completed with the gas undertakings of Birmingham, Coventry, Edinburgh, Glasgow (two works), Leeds, Manchester, Newcastle, Sheffield (two works), Sunderland, and Tottenham.

Work upon these twelve plants was commenced in March, 1915; and, on an average, eight to nine months were required to bring them into operation. In August, 1915, an urgent demand for benzol, in addition to toluol, arose; and it was recognized that the benzol contents of the crude spirit recovered from gas could not be put back for enriching purposes. Accordingly, a petrol spirit was used, although the amount of enrichment has gradually been reduced owing to the practical impossibility of obtaining this oil. It gradually became established that one to two gallons of 65's crude benzol per ton of coal could be recovered without serious inconvenience to consumers. These twelve plants have been in practically continuous operation; and the total products from them represent approximately the following quantities of pure products:

Benzol	5,873,400 gallons
Toluol	2,178,700 ,,
Solvent naphtha	495,100 ,,
Naphthalene	290 tons

THE "C" PROCESS.

Shortly after starting these plants, Mr. Chas. Carpenter, D.Sc, pointed out that a considerable quantity of toluol might be recovered by washing the gas with tar, and that such a process would not involve any extensive alterations or additions to existing plant. This process was speedily brought into use; and its introduction was supervised by a Committee consisting of: Mr. John Bond, of the Southport Corporation Gas-Works (who was then President of the Institution of Gas Engineers); Mr. A. Wilson, the Engineer of the Glasgow Corporation Gas-Works; Mr. John Young, of the Hull Gas-Works; Mr. Thos. Glover, of the Norwich Gas-Works; Mr. H. O. Carr, of the Wandsworth Gas-Works; Mr. J. H. Canning, of the Newport (Mon.) Gas-Works; and Mr. J. D. Smith, of the Belfast Gas-Works. These gentlemen were assisted by forty prominent gas engineers, who gave very valuable service as county supervisors. The process has been in operation at some 600 gas-works of all sizes; and by it the benzol and toluol content of the tar produced has been increased approximately as follows:

Untreated tar	Benzene.	0·75 to 0·85 p.ct.
	Toluene.	0·4 ,, 0·5 ,,
Treated tar	Benzene.	1·9 ,, 2·0 ,,
	Toluene.	1·0 ,, 1·1 ,,

Accurate figures are not available, owing to the large number of tests and difficulties of sampling; but it would appear that the "C" process has been responsible for the production of, roughly, the following additional amounts:

Benzene	2,012,000 gallons.
Toluene	1,050,000 ,,

In connection with the analysis of the tar, a number of analytical laboratories were established at the Universities of London, Glasgow, Leeds, Newcastle, Birmingham, Manchester, and Bristol; and the Department have throughout derived great benefit from the hearty co-operation of the respective Professors of Chemistry and their staffs.

CRUDE BENZOL RECOVERY PLANTS.

With the steadily increasing requirements of benzol becoming generally recognized by gas committees, certain undertakings, eager to render the maximum assistance in their power, erected benzol recovery plants independently of Government help—as far as possible out of spare pieces of apparatus already in their possession. The undertakings in question were those at Bournemouth, Southport, Falkirk, Wandsworth, and Wombwell, where it was intended to carry out the process of stripping only as far as could be effected without undue impoverishment of the gas. No enriching material was to be used—in fact, none was available. But in all these cases it became apparent that a substantial recovery of benzol could be effected without much inconvenience to consumers in the areas concerned.

As far as the supplies of materials would allow, similar crude benzol recovery plants were erected at various works throughout the country; and from these, to the number of about 170, a rate of recovery of from one to two gallons of crude benzol was steadily maintained. The yield naturally varied with the locality; and whereas some plants in Yorkshire produced three gallons per ton, others—for instance, in South Wales—were considered to be quite as efficient when only recovering from three-quarters to one gallon.

It may here be mentioned that the Gas Light and Coke Company were already oil-washing their gas at the outbreak of hostilities. The total amount of crude benzol turned out from these privately owned plants (including the Gas Light and Coke Company), together with the light oils obtained from tar dehydration, correspond roughly to the following:

Pure benzol	6,200,000 gallons.
,, toluol	2,300,000 ,,
,, solvent naphtha	1,500,000 ,,

TOTAL PRODUCTION.

The total production of benzol products from the gas industry during the war is therefore, approximately, as follows:

Pure benzol	21,800,000 gallons,
,, toluol	8,000,000 ,,
,, solvent naphtha	4,000,000 ,,

As high explosives, the above quantity of benzol represents about 1,200,000 tons of picric acid, whereas the toluol corresponds to about 65,300 tons of T.N.T., or 326,500 tons of 80/20 amatol.

BENZOL BONUS.

Owing to the fixing of prices for pure benzol, toluol, &c., the price of crude benzol was also more or less controlled; and at the end of 1917 representations were made to the departments that the prices offered for crude did not allow gas undertakings to regard benzol recovery as a paying proposition, in view of the extra expenses and difficulties arising out of war conditions. This matter was carefully considered, with the result that, from the 1st of January, 1918, a bonus scheme was brought into operation whereby the Ministry made an *ex gratia* payment of 2d. per gallon of "normal" crude benzol. "Normal" crude benzol was defined as that quality which would give an 80 p. ct. distillate at 160° C., when fractionated under specified conditions. Provision was made for a sample of each consignment to be analyzed at the University serving the particular district, and payment was made on the results of these tests combined with figures supplied by the gas undertakings and the consignees. This bonus scheme continued in operation until after the signing of the armistice.

CALORIFIC ORDER.

Although, with the increased use of incandescent burners, the illuminating value of gas has become a matter of minor importance, none the less a large majority of undertakings have to supply gas complying with a fixed illuminating standard. Experience proved that, whereas the reduction in calorific power of the gas by complete stripping was not reduced by more than 7 p. ct., the illuminating value of the gas could be largely destroyed. During the war all processes of stripping were carried out by Order of the Minister, in the exercise of his powers under Regulation 8 (*a*) of the Defence of the Realm Consolidated Regulations; and this Order was held to relieve gas undertakings of any forfeiture or other penal consequence in case the necessity of complying with it caused any failure to keep the gas up to the standard imposed by law.

Thus the prospect that a benzol plant would become useless at the end of the war, when statutory obligations in regard to the

value of the gas being supplied are restored, was the big obstacle which had to be met when urging additional gas undertakings to erect benzol recovery plants on their own account. Accordingly, the Board of Trade were persuaded to introduce a measure—Gas Standard of Calorific Power—which authorized the substitution of a calorific standard for an illuminating standard by Order of the appropriate Government Department. The Bill provided that, in considering the expediency of making such an Order, the department should have special regard to whether the undertakers had erected, or were prepared to erect, suitable recovery plants for the production of benzol and toluol. Advantage was very generally taken of this Order, with the result that approximately 85 such Orders have been made.

GAS-WORKS (MINISTRY OF MUNITIONS) ORDER.

Under the Order in Council of May 11, 1918, further amending the Defence of the Realm Regulations, the Minister of Munitions was given certain powers with regard to controlling the manufacture and production of gas in any gas-works. Accordingly, on June 28, 1918, the Gas-Works (Ministry of Munitions) Order, 1918, was issued with a view to assisting undertakings to cope with difficulties brought about by war conditions and by their efforts to meet requirements of the Ministry. This Order related to all gas-works which had both coal-gas and water-gas plant, and also to all works where facilities existed for scrubbing the gas for benzol and toluol. The Order specified a minimum calorific value of 500 B.Th.U. gross, apart from any reduction produced by scrubbing. When it was found impossible for any gas-works to supply the full demands of its consumers for gas while complying with the above regulations, it was ordered that the calorific value of the gas supplied should be kept as high as possible with the minimum, in all circumstances, of 450 B.Th.U. gross.

LABOUR.

The claims of gas-works and tar distillers for labour have been constantly put before the Gas Section, although the necessity of the War Office to claim as many men as possible for the Army gave little hope of such claims being met in full. By the release of men of low category, however, by the exemption of "pivotal" men (stokers, benzol attendants, &c.), by the supply of Army Reserve munition workers, and the substitution of female labour, the industry will probably agree that the section's efforts were of substantial assistance.

ALLOCATION OF GAS-OIL.

Early in 1916, the gas-oil position became very serious, owing to the reduction in shipping facilities and to the increased requirements of the Admiralty for fuel-oil. It was apparent that the total requirements of the gas industry could not be fully met; and all gas oil was supplied under a licence which was granted on the recommendation of the Gas-Works Section. Particulars as to the year's requirements of gas-oil were ascertained by means of forms, and the available supplies of oil were allotted as fairly as possible, having due regard to difficulties existing in each particular undertaking. As a result, for the past two years the quantity of gas-oil allotted was about 50,000,000 gallons; whereas the amount asked for was a little more than 71,000,000 gallons.

PRIORITY.

Previous to January, 1918, most of the applications for priority for gas-works were referred to the Gas Section by the Priority Department; and in many cases inspections and recommendations were made. At that time, however, it became apparent that, owing to the increase in the work, a separate subsection was necessary to deal exclusively with the gas-works priority matters, which were, accordingly, all considered by this subsection. Since that date, some 700 or 800 applications have been received, the majority of which have been recommended for high priority. In practically every case, a technical inspection was made; and a feature of the subsection's work has been the close following-up of orders and contracts arising out of these applications.

TAR AND CREOSOTE PRODUCTION.

Statistics were regularly taken by the section with regard to this matter; and although accurate figures are not available for the whole of the period of the war, it would appear that, during the four years, the production of tar was, roughly, as follows:

	Tons.
Gas-works	3,761,000
Producer plants	36,000
Coke-ovens	2,236,000
Water-gas plants	62,000
Total	6,095,000

Of this amount, some 5,000,000 tons were distilled.

Creosote production during the same period was 1,560,000 tons, of which nearly half was taken by the Admiralty for fuel-oil. In this connection, the Gas Section considered many applications for priority for tar-works plant, and did a great deal of work in connection with the transportation of tar, benzol, &c. Special schedules were arranged where necessary, and tank-wagons were provided in many cases.

CONTROL OF TAR.

In September, 1917, in order to meet the desire of the Admiralty to take for fuel as much home-produced creosote as possible, to obviate the importation of foreign oil, it was decided by the Ministry to control coal tar. From the 1st of October, 1917, coal tar could be purchased for any purpose (except distillation) only by licence. In December, water-gas tar was included in the Order; and producers required a licence for the use of any part of their production for any other purpose than distillation. These licences were issued by the Gas Section; and between Oct. 1, 1917, and Dec. 21, 1918, when the control ceased, there were issued 10,200 licences for tar for necessary purposes, such as roads, steel works, roofing, &c. The largest individual licence was issued to the Road Board, for 47,000,000 gallons of dehydrated tar for use, in 1918, on roads of national importance. By this control, the Admiralty was enabled to receive about 190,000 tons of fuel-oil.

A SNOW GAS-ENGINE BLOWER.

Details, with sketches and a photograph, were given in the issue of the "Iron and Coal Trades Review" for Jan. 31 of the Snow blowing engine which has been put down to supply blast for one of the furnaces at the works of the Parkgate Iron and Steel Company, Ltd., of Rotherham. The Company have, it is stated, already had considerable experience with gas-driven blowing engines. The first installation, consisting of two units, was put down some dozen years ago; and within a short time the plant was duplicated. The recent addition is, however, in the form of an engine entirely new to this country, which was built at the Snow Steam-Pump Works, Buffalo, (N.Y.), the British representatives of which are Messrs. Worthington-Simpson, Ltd., of Kingsway, W.C. When the house was extended to accommodate this engine, provision was made for the installation of two units; and the performance of the first has proved so wholly satisfactory that the Parkgate Company have already placed an order for the second unit, which will be built in this country by Messrs. Worthington-Simpson, at their Newark works. The engine is of the twin-tandem, horizontal, double-acting, four-cycle type, with power cylinders 24 in. diameter, blowing cylinder 59 in. diameter, and 4 ft. stroke. When running at its normal speed of 88 R.P.M., the set is equal to a duty of 25,000 c.ft. per minute, with a discharge pressure of 8 lbs. above atmosphere. The blower cylinder is fitted on the end of the frame opposite the power cylinders; the advantage of this arrangement being that the pipes and cylinders subjected to high gas pressures are farthest removed from the power end of the engine, thus reducing to a minimum danger from explosion due to accidental leaks. A centrifugal governor of the enclosed type automatically controls the amount of mixture admitted to each end of each cylinder. Should the governor be temporarily rendered inoperative, or its regulation become defective, there is the further provision of a safety device arranged to shut down the engine if a pre-determined safe limit of speed is reached. The gas-main is 3 ft. diameter, for two engines; and for all practical purposes it acts as a holder. It is tapped with a 24-in. pipe, which feeds through a water-sealed valve the 10-in. branches to the engine. The fuel consumption is rather less than 10,500 B.Th.U. per indicated horse power. The engine can be started-up from cold and can be run right up to its full speed in about three minutes; while in a further two minutes it can be put on full duty. The exhaust is absolutely silent; and the engine runs quite smoothly.

Bye-Product Recovery Plant at Caen.

A point of interest in connection with the subject of transport by inland waterways was mentioned by "Engineering" a fortnight ago, when describing and illustrating the Mondeville-Colombelles Iron and Steel Works of the Société Normande de Métallurgie. These works are situated close to Caen, and on the banks of the canal from that town to the sea. They are connected by a siding to the French State Railway, as well as to Caen harbour, and to a private harbour in close proximity belonging to the Company. A private railway, built by the Company, connects the iron and steel works with their Soumont iron mines 14 miles away. As to the canal, however, this is of such dimensions as to allow of 1800-ton boats reaching the private harbour of the works; and a deepening of the canal is being contemplated in the near future, in order to permit of a service by 6000-ton boats, and later by vessels of 8000 tons. There is at the works a bye-product recovery plant which at present consists of four batteries of coke-ovens, each battery with 42 ovens on the system of the Société Franco-Belge de Fours à Coke. The charge per oven is about 10 tons of coal; a battery yielding 250 tons of coke per 24 hours. Two other batteries are in course of completion. The bye-product recovery plant deals with the manufacture of sulphate of ammonia, the extraction and treatment of benzols, and the distillation of tars, followed by the treatment of phenols and naphthalene. Finally, a portion of the gas goes to heat the ovens; and the remainder is used under boilers for steam raising. The coal is delivered to the plant by 50-ton self-discharging wagons, into a series of five bins, each containing from 4000 to 4500 tons. Automatic trap-doors are provided, which allow of regular mixtures, and deliver the coal on to conveyors for transmission to the crushers when in operation.

SOUTH METROPOLITAN GAS COMPANY.

Directors' Report and Accounts.

THE following is the report of the Directors of the South Metropolitan Gas Company for the six months ended Dec. 31, which, with the accounts—an abstract of which appears below—will be presented to the proprietors at the half-yearly meeting to-morrow (Wednesday).

1.—After providing for the payment of interest on debentures, debenture stock, and loans, and the dividend on preference stock, the profit on working during the past half year, in spite of the high price of gas, falls short by £3729 of the amount required to pay 3 p.ct. on the ordinary capital. It is almost unnecessary to state that this is due to the cost of coal and freight, the continued increase in labour charges, and the reduction in gas consumption—the latter amounting to over 12 p.ct., largely resulting from the rationing regulations of the Coal Controller.

2.—The abnormally heavy cost of coal emphasizes the urgent necessity of securing the most efficient results from its carbonization, and justifies the policy of distributing through the mains and service pipes the benzol contained in purified gas, in order to satisfy the requirements of the public for light and heat. In this connection it may be mentioned that had the Company reduced the quality of the gas to the standard allowed under war conditions, its consumers would have required at least 10 p.ct. more gas to give the same amount of heat, and they would have had to pay during the six months an additional amount of not less than £127,474. It must be stated that the Company expressed its willingness to depart during the war from its practice of supplying gas of standard quality if required to do so by the authorities to meet a national emergency.

3.—As regards the accounts generally, the ever-changing conditions make comparisons with other half years of little value. It may, however, be stated in general terms that compared with 1913 the Company paid last year £1,075,380 more for coal and freight, and £483,751 more for wages, although the gas consumption in 1918 was 4·3 p.ct. less. The future, however, is full of hope for gas supply, providing the problems of economic coal production, fair wages for labour, and an equitable return on capital can be solved.

4.—The Bill promoted last session for increased capital powers passed unopposed through both Houses, and has now become an Act. The Government Bill, by which the Company obtains a safeguarded authorization to pay 3 p.ct. upon its ordinary capital during war conditions also received Royal Assent.

5.—At the urgent request of the Ministry of Munitions the Company, in the early stages of the war, transferred a large proportion of its staff to the production of materials required for the manufacture of munitions of war. For this purpose two complete works were designed and erected and two others remodelled, one of which was for toxic compounds. It also took the lead in the training and substitution of female labour in gas-works when the need for fighting men had reached a grave position. The Company has received the thanks of various Departments for the work it has carried out during the war, and two of its officials have been made officers and one a member of the Order of the British Empire. The Directors desire to take this opportunity of expressing their great indebtedness to members of the staff who have not only carried on the business with satisfaction under very trying circumstances, but who have also so ungrudgingly given their health and energy to the furtherance of those special efforts they were asked by the authorities to undertake.

6.—Of the Company's employees, 3744 responded to the Nation's call in her hour of need, 354 of whom have made the supreme sacrifice in defence of those at home, and to secure freedom from a barbaric despotism. Their devotion to duty will ever be held in honoured memory, and sincere sympathy is extended to the bereaved families. Other casualties include 653 wounded, and 14 missing. It is gratifying to report that 61 have received decorations in recognition of acts of bravery, a record of which the Directors and their fellow co-partners are justly proud.

7.—The Directors have to record with great regret the death of their esteemed colleague, Mr. John Ewart. He joined the board in 1889, and ever proved a wise counsellor, deeply in sympathy with the Company's aims. Mr. A. M. Paddon has notified his candidature for the vacancy thus arising.

8.—Two Directors (Mr. John Mews and Mr. Frank Bush) and one Auditor (Mr. Thomas Spooner Soden) retire by rotation. They are eligible and offer themselves for re-election.

CHARLES CARPENTER, *Chairman.*

709, *Old Kent Road, S.E.* 15.
Jan. 22, 1919.

The Accounts.

The following are the principal portions of the accounts accompanying the report:

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 p.ct. is payable on £6,011,224 and £598,671 (Act of 1901, as amended by the Act of 1916) of stock. The amount of 5 p.ct. preference stock under the 1916 Act is £250,000. The loan capital account shows that the loan capital, the rate of interest on which is 3 p.ct., amounts to £1,798,994 and £96,451 (Act of 1901, as amended by the Act of 1916). The amount, at 5 p.ct., under the Act of 1916 is £500,000. The third statement is the capital account. It stands as follows: Amount received, £6,211,816; nominal amount added by conversion (less premium), £3,043,524—total, £9,255,340. The items of expenditure are as follows:

Capital account to June 30, 1918		£5,503,371 14 1
Expenditure during half year to Dec. 31, 1918—viz.:		
New buildings and machinery	£14,224 1 5	
New and additional mains and services	2,022 1 4	
New and additional meters	3,295 1 6	
New and additional stoves	2,396 18 6	
		21,938 2 9
Total expenditure		£5,525,309 16 10
Balance		686,506 9 5
		£6,211,816 6 3
Nominal amount added by conversion, less premium		3,043,523 13 9
Total		£9,255,340 0 0

The net revenue account shows a sum of £101,669 applicable to dividend on the ordinary stock. The balances of the reserve, renewal, and insurance funds stood as follows on Dec. 31 last: Reserve fund, £126,744; renewal fund, £32,531; insurance fund, £85,104.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £289,330; coke and breeze, £66,586; tar, ammonia, and products, £221,096; and sundry plant and stores, £308,664. The figures this time last year were: Coal, £399,385; coke and breeze, £43,051; tar, ammonia, and products, £189,354; and sundry plant and stores, £308,837. A sum of £54,208, co-partnership bonuses and savings, has been deposited with the Company; and the total of the superannuation and guarantee funds is £161,475. The figures last year were £66,078 and £144,828.

The following is the revenue account.

REVENUE ACCOUNT—*Expenditure.*

Manufacture of gas—		
Coal into store, including £2275 18s. 7d. for London Port and tonnage dues	£988,5·9 10 5	
Purification	22,003 4 10	
Salaries of Engineer and Officers at works	25,561 16 2	
Wages (carbonizing)	88,839 10 3	
Repairs and maintenance of works and plant, less £8652 11s. received for old materials	230,337 3 2	
		£1,355,321 4 10
Co-partnership		..
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes	£46,946 15 7	
Salaries and wages of officers, including rental clerks	35,234 8 7	
Repair and renewals of meters	48,030 17 4	
Repair and renewals of stoves	22,599 14 8	
Repair and renewals of gas-fittings	18,456 0 11	
		171,267 17 1
Public lamps, labour and materials £22,986 0s. 4d., less £15,786 8s. 11d. received for the same		7,199 11 5
Rents, rates, and taxes—		
Rents payable	£1,441 12 7	
Rates and taxes	53,003 0 8	
		54,444 13 3
Management—		
Directors' allowance	£2,852 7 6	
Salaries of Secretary, Accountant, and clerks	6,204 4 8	
Collectors { Ordinary	7,900 16 10	
Collectors { Slot meter	22,939 17 9	
Stationery and printing	7,223 9 5	
General charges	12,197 11 9	
Company's Auditors	112 10 0	
		59,430 17 11
Miscellaneous—		
Law charges		738 0 10
Parliamentary charges		847 11 6
Bad debts		665 19 8
Stolen from 339 slot meters broken open		1:6 18 11
Superannuation, sick, and accident funds		9,400 19 4
National Insurance Act charges		4,986 18 11
Gas Referees and Official Auditor		215 8 8
Leasehold renewal fund		1,000 0 0
War Fund		8,791 6 8
Total expenditure		£1,674,487 9 0
Balance carried to net revenue account		154,084 10 6
		£1,828,571 19 6

Receipts.

Sale of gas—		
Michaelmas at 4s. per 1000 c.ft.	£464,688 8 0	
Christmas at 4s. 4d. per 1000 c.ft.	699,263 18 6	
	£1,163,952 6 6	
Public lighting	13,420 1 9	
		1,177,372 8 3
Meters at rent	£47,331 7 7	
Stoves and fires at rent	35,514 12 5	
Gas-fittings at rent	27,211 7 8	
		110,057 7 8
Residual products—		
Coke	£385,318 15 3	
Breeze	1,285 8 10	
Tar and tar products	82,515 18 11	
Ammonia and products	70,231 8 5	
		539,351 11 5
Rents receivable		1,720 9 8
Transfer fees		70 2 6
Total receipts		£1,828,571 19 6

Total amount paid in salaries for half year, £53,757 0s. 8d.
" " " wages " £576,043 10s. 8d.

Statement of Coal.

In Store June 30, 1918.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store Dec. 31, 1918.
Tons. 69,605	Tons. 605,978	Tons. 520,765	Tons. 1860	Tons. 152,958

Statement of Residual Products.

Description.	In Store June 30, 1918.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store Dec. 31, 1918.
Coke—tons	62,213	319,428	56,030	278,725	46,886
Breeze—tons	7,535	49,713	29,341	20,975	6,932
Tar—gallons	583,680	5,020,054	5,006,505	..	507,229
Ammoniacal liquor—butts	8,097	198,035	195,262	..	10,870

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Thousands. 6,507,524	Thousands. 86,462	Thousands. 5,840,386	Thousands. 6,022,392	24,848

COMMERCIAL GAS COMPANY.

Report and Accounts for the Past Half Year.

THE following is the report which the Directors of the Commercial Gas Company will present at the meeting of shareholders next Thursday.

Half-Yearly Report.

The Directors submit the accounts for the half year ended Dec. 31, 1918.

The revenue account shows a net profit for the half year of £53,887 2s., which, added to the balance of £34,318 12s. 11d. brought forward, produces a net revenue balance of £88,205 14s. 11d. Deducting therefrom £14,897 19s. for interest, there remains standing to the credit of the net revenue account a balance of £73,307 15s. 11d. available for dividend.

The Company's Bill in Parliament ("Commercial Gas Act, 1918") has received the Royal Assent.

The Board of Trade have made an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, whereby the Company, with the consent of the Board of Trade, are enabled to pay dividends, whilst the price charged for gas does not exceed 4s. 2d. per 1000 c.ft., at the rates of £3 p.ct. per annum on the Four per Cent. Stock, and of £2 12s. 6d. p.ct. per annum on the Three-and-a-Half per Cent. Stock, and the Directors accordingly recommend the payment of dividends at such rates, both less income-tax.

The balance of the net revenue will be carried forward to the credit of the current year.

Owing to the increase in the cost of coal and other raw materials, and the extra payments to the Company's workmen by reason of the war, the Directors found it necessary to increase the price of gas from 3s. 10d. to 4s. 2d. per 1000 c.ft., as from the taking of the meter indices at the Michaelmas quarter.

Messrs. H. D. Ellis and H. W. Gell, two of the Directors, retire by rotation, and, being eligible, offer themselves for re-election.

Mr. S. W. Savage, one of the Auditors, will go out of office by rotation, and, being eligible, offers himself for re-election.

WILLIAM GRAHAM BRADSHAW, *Chairman.*

Gas-Works, Stepney,
Jan. 29, 1919.

The Accounts.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on Dec. 31 last amounted to £996,405: that £1,076,875 had been added by conversion, making £2,073,280; and that £254,298 remained unissued out of the total authorized capital (including premiums) of £2,340,000. The total amount borrowed at this date was £339,062 10s., and £135,935 10s. was added by conversion, making a total of £475,000, and leaving £114,226 to be borrowed, out of the £585,000 authorized. The capital account receipts amount, with premiums, to £2,606,065. The expenditure stands at £1,505,527, with a nominal amount of £1,212,812 added by conversion—together £2,718,339. There is thus a balance of £112,274 carried to the balance-sheet. A sum of £2008 was during the half year expended on new and additional buildings, plant, &c.; £204 on new and additional mains and services; and £1174 on new and additional meters. But £11,578 is credited for steamships, stoves, and prepayment meters and fittings. The reserve fund amounted at the close of the half year to £44,327, and the insurance fund to £29,359.

The following is the revenue account:

Expenditure.

Manufacture of gas—		
Coal and oil, including dues, carriage, unloading, and trimming	£254 644 5 6	
Salaries of engineer and officers at works	4,499 0 11	
Wages (carbonizing)	21,501 17 5	
Purification, including labour	2,289 15 6	
Repair and maintenance of works and plant, materials and labour (less £563 1s. 7d. received for old materials)	44,570 10 2	
		£327,505 9 6
Profit sharing		1,889 17 1
Distribution of gas—		
Salaries and wages of officers (including rental clerks)	£9,174 13 3	
Repair, maintenance, and renewal of mains and services, material and labour	9,081 7 4	
Repair and renewal of meters	3,469 9 2	
" " " " stoves	13,518 13 11	
" " " " prepayment meters and fittings	14,270 8 5	
Maintenance of mantles and fittings	1,652 1 0	
		51,186 13 1
Public lamps—lighting and repairing		4,671 8 5
Rent, rates, and taxes		14,821 0 1
Management—		
Directors' allowance	£1,250 0 0	
Company's Auditors	75 0 0	
Salaries of Secretary, Accountant, and clerks	1,624 19 4	
Collectors' salaries and commission	2,120 19 5	
Prepayment meter collection	8,239 18 3	
Stationery and printing	2,558 14 3	
General charges	2,744 16 6	
		18,674 7 9
Bad debts		147 1 7
Law and parliamentary charges		794 8 6
Superannuations and allowances and Workmen's Benefit Society, &c.		2,762 11 4
Official officers, &c.		108 18 8
National Health and Unemployment Insurance		555 8 0
Allowances to employees on active service		3,667 14 4
Total expenditure		£426,785 8 4
Balance carried to net revenue account		53,857 2 0
		£480,672 10 4

Receipts.

Sale of gas—		
Per meter (number in use, 115,151) at 3s. 10d. and 4s. 2d. per 1000 cubic feet	£338,274 14 7	
Public lighting and under contracts	6,486 17 10	
	£344,76 12 5	
Less discounts and allowances	19,149 16 0	
		£325,611 16 5
Rental—		
Meters (24,518)	£3,129 13 6	
Stoves (87,809)	14,327 5 1	
Prepayment meters and fittings (90,007)	20,536 7 10	
Maintenance of mantles and fittings	792 10 1	
		38,785 16 6
Residual products—		
Coke, less £7500 os. 3d. for labour	£82,077 19 0	
Breeze, less £1995 15s. 9d. for labour	768 15 8	
Tar	17,477 7 4	
Ammoniacal liquor and sulphate of ammonia	15,929 3 5	
		116,253 5 5
Miscellaneous receipts—		
Rent receivable	£0 10 0	
Transfer fees	21 2 0	
		21 12 0
Total receipts		£480,672 10 4

Statement of Coal and Oil.

—	In Store June 30, 1918.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store Dec. 31, 1918.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	24,523	95,888	94,978	258	25,175
Oil—gallons	481,503	580,578	545,496	..	516,585

Statement of Residual Products.

Description.	In Store June 30, 1918.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store Dec. 31, 1918.
Coke—tons	6,775	64,110	8,221	57,244	5,420
Breeze—tons	4,323	8,083	..	8,132	4,274
Tar—gallons	653,223	1,017,164	..	917,700	752,687
Ammoniacal liquor—butts of 108 gallons	8,776	32,141	31,783	..	9,134
Sulphate of ammonia—tons	1	538	..	359	180

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands. 1,892,011	Thousands. 24,844	Thousands. 1,692,731	Thousands. 1,745,955	3,793

The last statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £66,650; coke and breeze, £8450; tar, ammoniacal liquor, sulphate of ammonia, &c., £22,681; sundry stores, £66,846—total, £164,628. The figures this time last year were: Coal, oil, &c., £103,306; coke and breeze, £5264; tar, ammoniacal liquor and products, sulphuric acid, &c., £17,147; sundry stores, £59,511—total, £185,228.

ELECTRICITY SUPPLY MEMORANDA.

NOT only here, but in other parts of the world, the pretensions of electricity to be an economical heating agent are being frustrated. A bold bid has been made to get a day load in this direction where an industrial power load is not available.

Fuel Uneconomy of Electric Heating.

But information on the subject of the relative value of fuels (solid or gaseous) and electricity is passing into rapid circulation among technical men. Means should be taken to get the same information, in a form that can be appreciated, into circulation among the general public, in order that they may not be unwittingly induced by false pretences to adopt electricity. This is not only a question of whether or not householders are willing to pay a heavy price for a low heating value; it is of national importance that the best possible use should be made of our fuel supplies. In the "JOURNAL" for Jan. 28, a highly informative article appeared in which was sketched a criticism that Prof. John W. Cobb had made of the Power Sub-Committee's report of the Coal Conservation Committee; and the author of the criticism had no trouble whatever in disposing by facts of the impudent claims of electricity to be an economical heating agent. In last last week's "Memoranda," some particulars were given from a report by the Hydro Electric Power Commission of Ontario, which showed that, even where the best water power the world possesses is available, general electric heating is an impracticable proposition. In the portion of the review of the proceedings at the meeting of the Dutch Gas Association appearing in our columns on Jan. 28, it was seen that a critical examination of the relative efficiencies of gas and electrical processes had been made by Heer A. C. Koppejan from the points of view of both fuel and appliance use. The claims of electricity to be a heating agent of economical virtue are therefore being attacked generally and vigorously. We will not go over the case presented by Heer Koppejan. It may merely be pointed out that he took electricity not only from the result basis of present practice, but looked at the matter on the hypothesis that much better efficiency conditions may be realized, although not at present attained, and some of those that he presented are never likely to be. The gas industry is going to secure (as can already be obtained by its retort steaming and mixed gas processes) higher manufacturing efficiencies. If it cannot be hoped that we shall be able to put as useful heat into rooms more than the present 75 p.ct. or so of the heat yielded by the combustion of gas, we are still expecting almost immediately higher efficiencies from the hot-plates of cookers and from ordinary boiling-rings. In connection with gas-ovens and in other directions, our manufacturers are fully alive to the advantage of putting consumers in possession of the highest efficiency; and the manufacturers of gas are being converted fast to the ideal of sending from a ton of coal as many B.Th.U. as practicable into their mains, though the consumers' accounts will continue to be charged up on the cubic feet basis. But the more B.Th.U. that can be produced in gaseous form from a ton of coal, the lower per 1000 or per 100 c.ft. will be the charge to the consumers, relatively to the costs that obtain for materials, labour, capital charges, &c. Thus our electrical friends will see that Providence is not giving them preferential consideration in the matter of progress, even if the British Government, in its ignorance, is that way inclined.

Small Stations and Thermal Efficiency.

The small electrical stations are sticking up for themselves—by deeds, and no words in lengthy documents issued by committees with a predilection for large things in the way of generating sets. The small station says that given a fair opportunity, there is not much difference between its thermal efficiency and that of its big brothers with unrivalled conditions—not anyway sufficient difference to justify the running of a network of expensive cables all over the country, the charges connected with which will probably completely snuff-out any difference of fuel costs, and a good bit more. In the "Memoranda" last week, we referred to the discussion that took place at the Institution of Junior Engineers on the question of national electricity supply, and mentioned that Mr. David Wilson, one of the Technical Advisers to the Coal Controller, spoke on the occasion. He gave some illuminating data as to the fuel efficiency of certain large and small generating stations, which show that there are representatives of the latter that may well resent being called uneconomical, for they are putting many of the large stations to shame in the matter of efficiency. He took 421 power stations (power, electric railway, and tramway stations) generating electricity by means of steam—their output in the year to March 31 last being 4,674,353,328 units. The coal consumed was 7,249,981 tons, giving an average of 3·47 lbs. per unit generated. Of course, the number of electrical stations does not include the whole in the country. Assuming the calorific value of the coal to be 11,500 B.Th.U., then the average efficiency of the 421 stations is 8·49 p.ct. Practically one-half of the units—2,276,606,974—were generated by forty stations in super-conditioned districts. Their consumption of coal was 2,616,912 tons, or 2 57 lbs. per unit. The balance of 381 stations generated 2 398,746,354 units, and in doing so consumed 4,633,060 tons of coal, or 4 32 lbs. per unit. The thermal efficiency of the forty stations was 11·5 p.ct.; that of the large remainder only 6·8 p.ct. "Meteor" of the "Electrical Times" has been diving into these figures; and he finds that seven of the stations generating between them 1300 million units have a thermal efficiency of 12·12 p.ct. But there are four smaller stations generating less than 50 million units, with a lower coal consumption and a higher thermal efficiency. And there is more as to small stations. There is one station generating 200 million units for 2·53 lbs. per unit, thus giving a thermal efficiency of 10·88 p.ct. Another station, generating only 40 million units, use 2·32 lbs., thus boasting 13·05 p.ct. efficiency. One with an output as low as 22 million units, uses only 2·49 lbs. per unit, thus showing an efficiency of 11·95 p.ct. Of another group of stations, the smallest generates 28 million units, at 2·45 lbs. of coal per unit, giving a thermal efficiency of 12·15 p.ct. What is to be said by the advocates of large power stations over the place these small stations occupy in the scale of thermal efficiencies? The best of these efficiencies are poor; but, so far as generating stations go, they are good, and are a challenge to the larger stations.

Electrical or Fuel Transmission.

Cheap generation of electrical energy is one thing; to get it to the consumers is another. "Meteor" politely scoffs at the electrical big-wigs who leave severely alone the question of transmission over large areas from super-stations. "There is a very big problem," he writes, "to be tackled by someone in authority on the electrical side. The Institution of Electrical Engineers are quite as careful to leave it alone as Mr. Merz is. And in this competition on the silent system, we think Mr. Merz will easily win." Mr. T. M. Hunter is an authority on power supplies; and in his reply to the discussion (published by us last week) on one of his papers before the South Wales Institute of Mining Engineers, he called attention to a point which shows that the departmental investigations into the questions of the reformation of the work of the electrical industry, and the relation of the industry to coal conservation, have not covered a sufficient area. Mr. Hunter stated that the cost of transmission of power by means of gas in mains as compared with electric power is both cheaper to instal and much more economical to use. It would, he asserts, be cheaper to carry gas in mains to existing electric power stations than to build new stations, and transmit the power by wires. Mr. Hunter's remarks may be extended by saying that the shorter the distance of transmission even of gas in bulk, the cheaper the transmission. As existing electrical stations are not far from gas-works, a development that might well occur would be to use in producers the incandescent coke from the retorts, make gas for power purposes, recover the ammonia, and pipe the gas to the electricity station boilers. The greatest obstacle to such a development as this is that electrical engineers seem to have some unaccountably strong aversion to being regarded as an appendix to the gas-works. There is also the sandwich system of fuel-blending for steam-raising, upon which Mr. E. W. L. Nicol had an article recently in our columns and in those of certain electrical contemporaries. In using coal and coke in the manner Mr. Nicol advocates, the coal receives advantage from the collaboration of the coke, and the coke is stimulated by the coal. In the test he gave with the combined fuel, the evaporative duty was remarkably good compared with the test with coal alone—the thermal efficiency obtained being respectively 80 p.ct. and 61 p.ct., or a difference of 19 p.ct. in favour of the combined fuel. Apart from this high thermal efficiency, if electric stations saved part of their coal carriage by purchasing coke from the neighbouring gas-works, there would again be an economy to set against bulk transmission from large central power stations. This question of transmission of electricity as compared with fuel conveyance (from coal pits and gas-works) to existing generating stations has by no means been settled; on the contrary, the electrical experts have obtrusively shirked it.

The Super Scheme.

The statement that the Institution of Electrical Engineers lately forwarded to the President of the Board of Trade (as noticed in last week's issue), and which was the essence of the views of considerable sections of the electricity industry and of important bodies representative of large consuming industries, has not given universal satisfaction to our electrical contemporaries. For instance, "Electrical Industries" looks upon the document as a most important one. The "Electrical Review" does not regard the Committee as being representative; nor does it approve of the limitations which they suggest should be placed upon the powers of the proposed Electricity Commissioners. We are disposed (if permitted an opinion upon so delicate an electrical matter) to agree with "Electrical Industries," for the electrical organizations have had practically all the say in the communications made on this subject to Government Departments, while this is the first occasion that industries outside it (but large customers) have been allowed, through their organizations, to have a word. That the municipal organizations were not upon the Committee is their own fault. They had the opportunity to be there; but they preferred to "paddle their own canoe." It is a pity. But they want to have too much their own way; and municipal domination of electricity generation is not everybody's preference, even among municipal authorities themselves. Take, for example, the report just issued by the Law Committee of the Association of Municipal Corporations. It champions the view that undertakings involving monopoly should be in the hands of public authorities. "Monopoly" of what—electricity, or light, heat, and power? Light, heat, and power are not a monopoly of gas or electricity, but coal and oil also come into the reckoning. On the

proposed District Electricity Boards, the Law Committee prefer that local authorities should have a preponderating voice. They object to the idea that, while District Boards should remain the owners of electricity generating stations, their operation might be transferred to a company as lessees. Agreeing with the opinion of the Board of Trade Committee that the District Boards should make no profit, the Committee point out the apparent inconsistency with this of the suggestion that the undertakings might be carried on by companies whose primary object would necessarily be to make a profit for their shareholders. The Committee say nothing about the District Boards having to make the money for interest, sinking funds, depreciation, &c., and that dividends can be limited as well as interest. Future local loans will have to pay a higher rate of interest than past ones. Moreover, supposing the District Boards do not work out their financial salvation quite as is expected of them, are the ratepayers to become the victims? Also the Law Committee desire that municipal authorities already possessing large power stations, and who wish to develop their own supply, should have the option of doing so. This would not make for co-ordination; and it would leave some areas without the advantage of having the load of the best consuming districts contributing to the economy of the super-stations of the District Boards. In other words, the District Boards would have to work with the lean areas; and the municipal authorities who preferred to develop their own concerns would retain the fat and most economical generating demand. If all those who have reported get their own way, what glorious confusion there will be!

SOME ARGUMENTS AGAINST 450 B.TH.U. GAS.

[FROM A CORRESPONDENT.]

PRESUMABLY it will be admitted that if British Thermal Units cannot be supplied to the public at a cheaper rate by selling gas of 450 B.Th.U. (gross) instead of 520 to 580 B.Th.U., which for convenience may be termed 550 B.Th.U., and which may be considered to be pre-war gas, the case is already proved. If, when more normal conditions again prevail, it is thought that 550 B.Th.U. gas can be supplied at (say) 3s. per 1000 c.ft., it is clear that 450 B.Th.U. gas will have to be supplied at 2s. 5½d. to put the consumer on a par, so far as expense is concerned, with the price for the higher quality gas. But the consumer will probably want it at a lower price to compensate him for the longer time which cooking the dinner, boiling the water, or warming the rooms takes by reason of the change. It would appear to be quite certain that if, by improving gas consuming apparatus, it can be made to carry out the above operations as quickly with 450 B.Th.U. gas as was before the war done with 550 B.Th.U. gas—and this should be quite possible—then it should be equally certain that gas consuming apparatus designed for using 550 B.Th.U. gas can be as readily improved, and to the same extent, which would leave the position *in statu quo*. Consequently, it will still be necessary, in the opinion of the writer, to sell 450 B.Th.U. gas at a lower rate per B.Th.U. than 550 B.Th.U. gas. Therefore, if 550 B.Th.U. gas is to be sold at 3s., 450 B.Th.U. gas will have to be sold not at 2s. 5½d., but at a lower figure—say, 2s. 4d.—to give the consumer equal value.

How is this to be done? It is clear that an undertaking supplying 500 million c. ft. of 550 B.Th.U. gas before the war would now have to supply 611 million c. ft. of 450 B.Th.U. gas to provide equivalent heat at the lower quality; and this has to be supplied at a lower aggregate cost than the 500 million c. ft. of the higher quality. It is certain that the works can make 450 B.Th.U. gas considerably cheaper than they can make 550 B.Th.U. gas. Oil or coal would be saved in large quantities, whichever way it is done. But how far will this go in reducing the sale price from 3s. to 2s. 4d., when the total works cost is not likely to exceed much more than one-third, or 1s. of the total of 3s.? As every engineer knows, wear and tear of works plant in normal times usually costs about one-half of the total works cost of making gas. Is this ratio likely to be reduced by much when making 450 B.Th.U. gas; and, if not, what possibilities are there of reducing the 1s. by more than a few pence—say, 2d. or 3d. at the most? It must not be forgotten how profitable is the coal-gas making process when residuals are selling well. How often the net coal costs (coal *minus* receipts from residuals) were but 1d. or 2d. per 1000 c. ft., while sometimes there was actually a credit, so valuable were the residuals? Are the possibilities of this efficient process to be thrown aside in favour of an untried (under normal conditions) system, which may well ruin the prospects of the industry? It is always a dangerous thing to lower the quality of a product. Why should gas be an exception?

The most important disadvantage of the lower quality of gas is the very heavy capital outlay it will assuredly entail. It is quite certain that where 1,000,000 c.ft. of 550 B.Th.U. gas has been supplied, this, to provide the same number of British thermal units, will have to be 1,220,000 c.ft. of 450 B.Th.U. gas. Consequently, the size of all plant on the works—foul mains, condensers, exhausters, washers, scrubbers, purifiers, station meters, holders, and governors—will have to be increased in this ratio, sooner or later, to correct for the larger volume of gas. Not only on the works, but also on the district, the position will be worse, because it is not possible to enlarge mains without incurring enormous expenditure; and this will render imperative, again sooner or later, the carrying out of a comprehensive scheme for connecting-up and extending mains, with the probable addition of boosting plant. There is no other logical conclusion to which any reasonable man can come. In fact, put in other words, it means that the vast expenditure entailed by an increase in gas sales of 22 p.ct., so far as nearly all the plant from foul mains to the householders gas supply pipes is concerned, will have to be met during the next year or so, and much of it immediately, instead of during a long period of years. Not only gas mains, but services, meters, and supply pipes will all be too small; for even now few of these are large enough to meet the peak loads, which always occur whenever cooking operations coincide with the use of gas-fires and hot-water apparatus, which is daily occurring in many English households.

It has sometimes been said by those who have been supplying 450 B.Th.U. gas during the war that the public are satisfied, as is proved by the fact that they do not complain. This answer should carry conviction to no one. Have those who make this answer, or those who accept it, been satisfied with the war bread, their ration of meat, travelling facilities, and the hundred and one other necessaries of life which have mostly been, and quite naturally so, very deficient in one way or another? Assuredly no. But it is doubtful if they have complained, as they, like everybody else, accepted inconvenience as part and parcel of the war, and would consider the act of complaining as something unpatriotic—it being necessary to the conduct of the war. Clearly it is the same with gas complaints. Most of us have evidence of this from the remarks of personal friends. Further, it is probable that the gas supply of our towns has not been worse than the supply of other commodities, which means that it has been very bad. But the receipt of the normal number of complaints means absolutely nothing in favour of the supply given.

Apart from other considerations, the time is not ripe, in the opinion of the writer, for any radical change in the quality; for this must be a plant of slow growth. Gas appliances have not yet been adapted to use such a gas efficiently; and no one can seriously consider that the crude adjustments made by some undertakings during the war can be looked upon as permanent. Surely it is wiser to let steady evolution, and not hazardous experiments, guide the future developments of our industry.

WHAT IS WRONG WITH THE GAS INDUSTRY?

BY AN OCCASIONAL CONTRIBUTOR.

THE war seems to have left the gas industry, if not dead, then at least moribund. There seems to the writer to be no policy, no co-ordination, no concerted plans for the future. Compared with our competitors, we have certainly lost ground during the war; and, as the "JOURNAL" states, in the second Editorial Note of the 4th of February, it is "imperative for the industry to get its legislative conditions established in revised form, and its potentialities recognized in Government quarters." The writer would lay particular stress on the last half-dozen words; for they are equally necessary for our future success, though more apt to be overlooked than the former portion of the quotation.

In dealing with the former part, we must convince our legislators of the changes in the manufacture of gas and treatment of residuals brought about by war conditions, as well as the post-war basis of our economic position. Now is the time for "a complete revision of the statutory obligations" imposed on us referred to by Lord Moulton in his Presidential Address to the Institution of Gas Engineers in June last year as a necessity in 1884. We must therefore consider to which authority or association should be delegated these tasks; and, having agreed, see that the body is equipped with every facility and the best brains that can be provided, rather than leave the work to be done at the periodical meetings of busy men and by an unwieldy executive.

The leading lights of our various associations are usually men of so many interests that they are too busy to give the necessary study to the needs of the industry as a whole, or to develop and fructify the work done in committee. It would seem better for our leaders to attend the meetings and give their ideas; the whole-time officials of the association should develop them and guide the finished work into the proper channels, backed by the influence of the committee individually and as a body. It is therefore necessary that these officials should be capable men; otherwise the harvest will not be gathered.

Is it clearly defined where the functions of the following begin and end? The Institution of Gas Engineers, the Gas Companies Protection Association, the National Gas Council, the British Commercial Gas Association, the Society of British Gas Industries, the National Benzol Association. It seems that there are too many independent bodies looking after our interests, with consequent overlapping; and one may reasonably ask which of these is responsible for defining and developing our policy in vital matters? It is presumed that the National Gas Council was regarded as a necessity; but it appears to the writer that its functions could have been exercized by an existing organization, extended if necessary. If it was necessary, why was it not formed before infinite harm had already been caused to the stability of our industry?

Are we getting the best brains among the younger element of our business and scientific men? It does not appear so; a good reason being that we are not paying sufficient in salary to keep the good man in, or to attract the brains from outside. Take two

items in the "JOURNAL" for the 4th of February. On p. 222, Mr. Fairweather draws attention to the salary of £150 per annum offered for an assistant to the Research Chemist. In the personal column (p. 211), a gas manager (with a knowledge of electricity) is given £182 per annum. Other specialized industries have learnt lessons from the war, and are now convinced that brains beat brawn, and should be more highly remunerated.

Reverting to the National Gas Council, it is not sufficient, in the writer's opinion, to have all the eminent men of the profession on the Council or Executive. The officials, particularly the Secretary, should be live men. The Secretary should have an internal knowledge of the technical and commercial sides of our business; and the salary paid should be sufficient to tempt one of the very best that can be found. An assistant could attend to the routine work of arranging meetings and drafting circular letters on general matters. Here let it be said that the writer knows nothing of the present Secretary; but if a man of the above qualifications has not been chosen, then a fatal mistake has been made.

From inside knowledge, it appears that allied and competitive industries have profited more than ourselves by war conditions and control. The electricians flooded the Governmeat Committees and local panels with smart live men, who looked after their interests, and, as stated in the "JOURNAL" for Feb. 4, "they got in every time." To-day we are faced with the prospect of fighting for our very existence. The politicians, and would-be politicians, prompted or primed no doubt from other sources, have promised the voter an electrically-operated future. We know that it cannot be done. But out of the promises made, something will be done to our detriment. One candidate drew a beautiful picture of the rural lanes lighted by wonderful electric lamps every few yards; and the Press has given prominence to the workman's dwelling of the future operated by cheap electricity with every labour-saving device. We have to educate the population, and overcome some of the appalling ignorance of even educated people regarding the possibilities of gas and electricity, and, moreover, must take some action with a Press which, if not anti-gas, is certainly pro-electricity. Whatever is the reason for this state of things, whether ignorance, malice, or self-interest, it must be taken up with a strong hand. The writer is fully aware what a great amount of valuable spade-work has been done by the British Commercial Gas Association in some of the matters above referred to; but it does not seem to have reached quite the right quarter.

Chemical manufacturers, coke-oven gas experts, and others all seem to have done much better than ourselves in negotiations with Government departments, or from their association with Government committees. In many matters concerning bye-products, we had representatives, it is true, but nobody with a defined policy, or power to speak for anyone but himself.

To turn to our latest association, that connected with benzol. Steps should immediately be taken to prevent the distribution of this product being handed over to existing petrol companies, and having come to this decision, to acquaint the Daily Press at once. Here we have the Press and a large section of the public taking an interest in us; and we remain dumb. When shall we see ourselves as we are—viz., mere tradesmen, as much in need of publicity as the local ironmonger or Harrod's Stores. Incidentally, the Benzol Association are sending communications to gas-works making 4 millions a year. And this from Horseferry Road!

Very little has been done by the larger companies to help the smaller ones in the matter of working-up residuals. The writer is aware that some undertakings are prevented from doing so by their Acts of Parliament. But what is there to prevent the formation of subsidiary companies to deal with the tar and liquor of certain districts? In other cases, too, chemical works pay higher prices than gas-works nearer to the seller. This should not be possible if we knew our business thoroughly.

And what of the future? Can one state the policy of the industry in this connection? Have we, who talk of low calorific value, thought of the capacity of our works, plant, size of meters, cookers, mains, and services? Have we considered our standard calorific power in connection with standard price, and whether we intend to get the latter settled on a post-war basis before we start considering the economic effects of the former. But the time will come when prices and dividends will be dependent on a combination of both. And when this time arrives, shall we be ready with our conclusions on the economic aspect, not forgetting the interest of the consumer, for whose ultimate benefit we primarily exist? The same question arises in the matter of the percentage of inerts. In all these things engineers, managers, and directors appear to be sitting on the fence. We have no policy, and few of us can see farther than our own office door. We must not forget that the safety of our respective undertakings is vitally involved with, and dependent upon, the success of the industry as a whole. We have so much accumulated knowledge and so many good men, in spite of other defects, that it almost forces one to the conclusion that internal jealousy is cramping us, or that our young men are not being given enough scope.

The optimist may argue that all these things could not be remedied owing to the war. But what about commercial undertakings who have multiplified their output by four, five, or ten, and then commenced the manufacture of an article they have never handled before, with exactly the same difficulties as ourselves? To summarize, therefore, let us: (*a*) Get the best brains and keep them. (*b*) Get our various associations into line, eliminate overlapping and bulky committees, and appoint the very best men as officials. (*c*) Realize that we must sink or swim together, and broaden our outlook. (*d*) Co-ordinate and lay down our policy now; and, having settled it, go for it "neck or nothing." (*e*) Take steps to ensure that our commercial progress, both internally and competitively, keeps pace with our scientific attainments.

SOME GOVERNMENT RESTRICTION ANOMALIES.

II.—STOCKS OF COAL.

By NORTON H. HUMPHRYS.

THE present position in regard to stocks of coal in the gas-works stores is remarkable, in view of the fact that active hostilities have ceased for nearly three months, and suggests that the conclusion of peace, so far from opening up a way into calmer waters, will simply turn over the first leaf of a new chapter of trouble as an aftermath to numerous hasty and ill-considered expedients that have been enforced by the Government during the last five years, as the best means at hand for meeting contingencies, without regard, in some cases, to obvious disadvantages of a more or less permanent nature.

That much unrest and disturbance would arise among the labour classes, as soon as war conditions ceased, and demobilization was in active progress, was a foregone conclusion to all experienced employers. The fact that a large number of men are taking well-earned rest and recreation, after the hardships incidental to life in the trenches, before returning to the duties of civil occupation, has started a tune to which many of the much less deserving—who at all times prefer pleasure to duty, and welcome any excuse for jollification—are inclined to dance. The contingency has been evident, yet all attempts at some reasonable provision against it have been frustrated. Those who have sought to maintain stocks adequate to the requirements, having due regard to the rights of other users of coal, have met with scant sympathy, in no way proportioned to the emergency. Really, the authorities seem to view a stoppage of gas supply as a trifle that need scarcely be seriously taken into consideration.

Gas engineers have settled, long ago, that a prudent provision of stock, under normal circumstances, is the equivalent of six weeks' maximum demand. As much has been accepted without question, as a fair and reasonable figure, in all legal regulations concerning coal stocks—that is, before the war. Is there any other instance of a user of coal being cut down to one-fourth, or less, of the customary stocks, not at a momentary emergency, but over a period of several months? The quality of the stock, from a gas-making point of view, must not be overlooked. For all practical purposes, its value cannot be accurately estimated by the mere tonnage, but must be taken according to its potentialities as a gas producer. Of course, 900 tons of coal that can be relied on to yield 12,000 c.ft. of gas per ton, are preferable to 1200 tons of a material from which it is impossible, in any circumstances, to get more than 9000 c.ft. of gas. Apart from other considerations, the quality of the coal may affect the practical value to the extent of 25 p.ct.

According to an editorial statement [*ante*, p. 207], in mid-December the number of gas-works holding "less" than seven days' stock was 41, which a month later increased to 48. The corresponding figures for "less" than fourteen days are 67 and 91. In this case, the Christmas holiday intervened; so a comparison of these figures with the returns for mid-February will give a better idea of whether the position is improving or otherwise. "Less" than seven days, is a euphemistic way of putting the case, as representing a more rosy condition than is in accordance with fact. The aggregate stocks are actually substantially "less" than the seven or fourteen days' limit; and to take an extreme case, a works shut-down through having no coal would figure as "less" than seven days in the official return.

One would also like to know something of the works concerned, as affecting the actual tonnage of coal represented. They might, on the one hand, consist chiefly of small village undertakings, or, on the other, include a majority of the first magnitude in the country. Reading between the lines, the condition means simply floating on the verge of disaster; and a failure or stoppage that would be a trifle under normal working, is sufficient to necessitate restricted supply pressure. Thousands of industrial operations incidental to reconstruction are dependent upon an adequate gas supply—a matter that deserves attention at the present time. But it is also closely concerned with questions that affect public health and safety, which are even more weighty. The importance of these facts has never been fully appreciated, from the official point of view; and we frequently find local authorities, as representing the consumers, not only indifferent, but actually hostile to schemes for enlargement of plant that tend to secure reliability and less danger of failure at times of extra heavy demand.

Attempts to classify coal consumers in their order of relative importance are always subject to differences of opinion among the parties concerned. But there is one fact not to be disputed. The user to whom coal is a vital necessity, to whom a failure in supply means a complete breakdown, is entitled to preference in the matter of stock, before another one who, possibly without acute inconvenience, could carry on for a time with the aid of some substitutes.

Makers of straight coal gas, having no carburetted water gas or other auxiliary plant, certainly come under the first category.

Those who have means for the production of mixed gas could afford to accept an equivalent in oil at a reasonable price, for part of the coal stock. But they are dependent on a supply of coal sufficient to furnish coke. The position is that one class of gas-works is entirely dependent upon coal, while another can afford some relaxation.

If stocks were reduced on something like *pro ratâ* lines to all users, when national need made a reduction necessary, no one would have reason to complain. That this is not the case is shown by comparing the position of the straight coal-gas works with the average gas-consuming householder, who belongs entirely to the second category. While gas-works figure their reserve in terms of days, the householder, under the "restriction" of Fuel Orders, can lay in several months' stock of coal—in fact, far exceeding anything that he has been accustomed to—and also provide substitutes such as wood in addition, and can eke-out his fuel with coke from the local gas-works. The gas engineer may be restricted to a dangerous extent at the gas-works, but be surfeited as an ordinary householder in his home.

There were seven to eight millions of gas-consuming householders in the United Kingdom, of whom quite three-fourths use gas for purposes other than lighting—such as cooking, warming, power, and other technical operations; and it would be interesting to take a vote among this important section of the whole population as to which would be considered the worse of two evils: (1) To be without gas for a month; or (2) without coal for a similar period. He could laugh at the second, in view of his abnormally large stocks of solid fuels, but would not so cheerfully accept the first. Yet to-day we are faced with the anomaly that a householder with a stock of solid fuel that would carry him well on into next summer, may find the gas-cooker or bath-geyser useless at a time when they are more particularly required, and be compelled to pass the evening under the dismal surroundings of candle illumination.

Many householders of the smaller class have not storage space for a quarter of the fuel allowed under the restrictions, which seem to follow the lines of generosity to those who are not able to avail themselves fully of the licence, and a strong swing in the other direction to those who, with an eye to their legal obligations, have provided ample storage space. In many districts, it would be quite feasible to stop supplies of coal to householders having more than two months' stock, and to divert the surplus towards bringing the gas-works stocks up to a proportion adequate to their position as administrators to public utility, which they have not enjoyed for some considerable time.

WASHING LIGHT-OIL FRACTIONS FROM COKE-OVEN GAS.

As mentioned last week, the recent Bye-Product Coke-Oven Number of the New York "Gas Age" contained an article by Mr. F. D. Schreiber, the general foreman of the benzol plant of the Brier Hill Steel Company, Youngstown (Ohio), dealing with methods which are said to have resulted in considerable economy in washing light-oil fractions from coke-oven gas.

The author says that in the distillation of light oil, before the crude benzol, toluol, light solvent naphtha, and heavy solvent naphtha can be obtained in a pure form, it is necessary that they be first washed with acid, and the excess acid removed by some neutralizing agent. In place of caustic to neutralizize the acid after washing the benzol, it has been found practical to replace this high-priced chemical by lime as a neutralizing agent.

At this plant, the Koppers type of agitator is used for washing the light-oil distillate. The agitator holds 5200 gallons (approximately), and is charged full. This is important, because as much acid is consumed for a light charge as for a full one; and greater efficiency can be obtained by a full charge. Light oil fractions should not be washed in any type of agitator with a capacity of less than 5000 gallons.

The washing of the crude benzol is accomplished in the following manner: After the agitator is charged, it is allowed to settle for an hour, and the last traces of water drained off. This is very important, because water will cause a thick, sticky sludge. which is liable to plug the drain-pipes from the agitator. After all the water has been drained off, the acid washes are made as follows:

Wash No.	Time of Stirring. Minutes.	Gallons Acid Used.	Time of Settling. Minutes.
1	3	5	2
2	5	5	2
3	5	5	3
4	10	5	3
5	20	10	3
6	20	10	5
7	30	10	5
8	45	15	10
9	60	20	10
10	120	30	10
11	120	25	15
Total acid		140 gallons	
12	30	200 gallons water added	30
13	30	25 lbs. lime added	30
14	0	100 gallons water added	0
15	10	5–8 gallons caustic soda added	10

The greatest care should be taken to drain-off the last traces of sludge after each wash, so that the agitator will not become plugged. When using this method of washing, the acid should not exceed 0·45 lb. per gallon of product washed.

After the last acid wash, and after the last traces of sludge have been removed, the oil is agitated for thirty minutes with 200 gallons of water, which will take up a large amount of the acid left in the benzol. This water is allowed to settle-out for half-an-hour and is then drained off.

USING LIME TO REPLACE CAUSTIC.

It has been the practice to use lime in place of caustic soda. As it has been shown that this use of lime is quite practical, and as almost every coking plant already has a supply of lime on hand, and is constantly using lime in the ammonia stills, there is no reason why the caustic should not be replaced by lime. Apart from the saving in caustic, there is another point which makes for better operation. In toluol and solvent washes, the washed product will always show a little free acid on a distillation test Though the washed product may be neutral or alkaline when distilled, sulpho-acid compounds break-down, and form free acid in the distilate. In the past, this free acid has caused much trouble in the boiler-stills, by eating-out the tubes of the dephlegmator. By the use of lime this is overcome, as there is no free acid formed in the distillate.

Washing Benzol.—In place of the caustic, there is now being used 25 to 40 lbs. of lime, This is ordinary burnt lime, and contains about 97 p.ct. active lime. It is important that this lime is well burned, and that it does not contain much grit or stone. With lime, care must be used to get it thoroughly slacked and reduced to a milk of lime that will not throw-down suspended matter and plug the agitator. Some 25 lbs. of this lime are slacked with a little water several hours before using, so that it is thoroughly broken-up; and then, when ready to use, it is mixed with about 75 gallons of water. This is then added to the agitator, and stirred for thirty minutes. The unused lime and $CaSO_4$ are drained off, together with the water added; and then the charge is washed-down with about 100 gallons of water, and this water drained-off. At times all the acid in the charge will not be neutralized by the action of the lime, and it may be necessary to use a little caustic solution. This has to be done, because some of the benzo-sulphuric acids and soluble sulphur compounds formed in washing are dissolved by the benzol, and are not removable by the action of lime alone. From 5 to 8 gallons of caustic are required to neutralize these benzol acid compounds. This amount is added, and stirred for ten minutes, allowed to settle ten minutes, and then drained off. The excess caustic is removed by washing-down with 100 gallons of water, and draining this water off.

Washing Toluol.—In washing the crude toluol, a slightly different method of using the acid is followed. First, the agitator is charged to capacity, and allowed to settle, and the water drained-off, as in the benzol wash. The acid is then added.

Wash No.	Time of Agitation. Minutes.	Gallons of Acid.	Time of Settling. Minutes.
1	5	5	5
2	10	5	5
3	20	10	10
4	45	20	10
5	60	15	10
6	0	200 gallons water added	30
7	30	75–100 lbs. lime added	10
8	15	200 gallons water added	10

In the case of the water-wash after the acid, no agitation is needed, because the water would be emulsified with the oil and settle-out slowly. When washing toluol, more lime is needed for neutralization than is required in the benzol wash—usually between 75 and 100 lbs. This is added at one time, having been previously slacked as in the benzol washes.

Washing Solvent Naphtha.—The following washes are employed in washing crude light solvent naphtha.

Wash No.	Time of Agitation. Minutes.	Gallons of Acid.	Time of Settling. Minutes.
1	5	5	5
2	10	5	5
3	10	10	5
4	20	10	10
5	30	10	10
6	30	20	10
7	45	20	30
8	0	300 gallons water added	30
9	30	75 lbs. lime added	10
10	30	50 lbs. lime added	30

In washing solvent, it is very necessary to keep the charge in the agitator as cool as possible. On the third wash, the solvent will heat-up considerably. It is best then to cool the charge by stirring without adding acid. The agitator may be also fitted with a cooling coil.

The Illuminating Engineering Society will meet at the Royal Society of Arts on Tuesday evening, the 25th inst., when a paper entitled "Some Notes on Railway Lighting and its Maintenance" is to be read by Mr. A. Cunnington, the Lighting Engineer to the London and South-Western Railway.

MR. GEO. HELPS AND MR. ISAAC CARR ON THE RESPECTIVE EFFICIENCY OF 350 AND 500 B.Th.U. GAS FOR BOILING WATER.

The following correspondence has been forwarded for publication—arising out of an incident (reported in the "JOURNAL" last November) that occurred during the proceedings at the quarterly meeting of the Manchester District Institution of Gas Engineers.

Widnes, Feb. 6, 1919.

SIR,—I desire to advert to my letter, *re* the above matter, which appeared in your issue of Nov. 5 last.

Those of your readers who have not forgotten the incident may wonder what has become of the one hundred guineas I sent to the President of the Manchester District Institution of Gas Engineers in accepting the challenge of Mr. Helps at the Manchester meeting on Oct. 25, 1918.

A letter from the President [appended herewith] shows that the cheque has been returned to me, for the reason that Mr. Helps and I have been unable to agree upon conditions for comparative tests.

The grounds upon which disagreement has arisen are set forth in the correspondence between Mr. Helps and myself, which is also appended.

The contention of Mr. Helps is, in my experience, so preposterous that it is not without misgiving that I venture to ask you to again bring the matter under the notice of my compeers.

The negotiations for an independent demonstration of our difference having failed, I gave instructions for a series of comparative tests to be made at Widnes, the results of which, although obvious, may still in some respects be of interest.

In my experience, the figures indicate there or thereabouts what happens to consumers when engaged in the operation of boiling water with gas of varying qualities.

Quality of Gas, B.Th.U.	Cubic Feet of Gas used.	Total. B.Th.U. used.	Time to Boil 1 Quart of Water.		Pressure at Inlet of Test-meter. Tenths.	Water. Therm. Cold. Fahr.	Water. Therm. Boil. Fahr.
			Min.	Sec.			
536	1·67	895	10	24	18	53	212
530	1·75	927	10	25	18	53	212
500	1·84	920	9	30	19	52	212
498	1·80	896	11	10	18	53	212
498	1·76	876	11	16	18	53	212
498	1·75	871	11	10	18	53	212
498	1·75	871	10	35	18	53	212
495	1·87	926	10	10	19	52	212
404	2·34	945	17	30	19	53	212
380	2·55	969	18	30	19	53	212
360	2·45	882	16	12	23	52	212
360	2·44	878	13	56	25	52	212
356	2 38	847	15	45	18	52	212
353	2·62	924	16	25	19	52	212
340	2·79	948	16	20	19	52	212
340	2·86	972	10	15	42	52	212
340	2·75	935	15	40	26	52	212

Hot-plate burners on six different types of cookers were tried with the low-grade gas; but there was difficulty in obtaining comparable burner efficiency on account of the restriction of the air supply necessary to maintain a flame. So the cooker tests were abandoned; and the whole of the observations were carried out with a ring-burner of which type there are probably hundreds of thousands in daily use.

The distance from the point of ignition to the underside of the kettle was 1⅛ in. The burner was fitted with an adjustable clip over the air inlet, which had to be brought into operation with the lower-grade gases.

Each sample of gas under observation was stored in a test holder (150 c.ft. capacity); so that no change in the quality of the gas was possible during the progress of each test. The low-grade gas was made by placing the holder under a slight vacuum, and drawing in air through a tap in the crown of the holder, and mixing it with the gas contained therein. Calorific tests were made before and after each boiling test. Each test was carried out under comparable conditions.

It is quite true that the tests were not made by "a chemist of unquestionable repute in the gas industry," but by members of my staff competent to make ordinary daily gas-works tests, which tests are in my judgment sufficiently near the mark to indicate the baneful effect that low-grade gas inflicts upon the consumer, both in loss of money and time.

However, the testing plant at Widnes is at the service of anyone (not financially concerned in the manufacture of low-grade gas-plant) who may desire to check the foregoing figures, or to make any additional comparative tests.

ISAAC CARR.

The following is the letter referred to in the third paragraph of the above communication. It was written on the 4th inst. by the President of the Manchester Institution of Gas Engineers.

Dear Mr. Carr,—More than three months have now elapsed since the challenge of Mr. Helps at the Manchester meeting with reference to low-grade gas, which challenge was accepted by you. The Committee of the Manchester District Institution have had the matter under consideration. In view of the attitude adopted by Mr. Helps, as revealed in his letters to you, the Committee are unable to take any action, although they are of opinion that such attitude is altogether unreasonable.

I am therefore returning to you herewith the cheque which you sent to me in October last.

You are at liberty to communicate this to the Technical Press.

(Signed) JNO. P. LEATHER.

Appended are the essential portions of letters on the subject that have passed between Mr. Carr and Mr. Helps.

Letter from HELPS to CARR, dated Dec. 12, 1918.

Dear Sir,—In regard to putting this little matter on to a right footing for proof, I beg to suggest as follows:

1. That a committee of seven be appointed.
2. That we each name three men for such committee.
3. That these six men appoint a seventh, as umpire.

The principals concerned to have the right to attend all meetings, and to be present at all tests. I would further suggest that it would be well if one at least of the three that we each nominate should be a chemist of some standing.

The first work of the committee to be to decide the nature and scope of the reference, which is of chief importance.

Now as to the tests to be carried out:

1. I assume that these will be carried out on lines laid down by the referees, in consultation with both of us.
2. I take it that there will be no objection to my making my own tests before the referees and yourself, so long as the lines adopted are approved, as referred to in (1).
3. I have given some little thought to the manner in which the tests will have to be arranged; and it seems to me that, roughly, the lines will have to be something like this:

Several towns should be chosen, where consumers are now supplied, or have been until recently, with gas of about 500 net; and from these a preliminary selection of six should be made—Widnes to be one, and Nuneaton another.

In each of the six towns, six (or more) houses are to be taken, situated in different parts, where the gas cooker is in regular use, and the selection of the houses to be made by ballot.

The ordinary kettle of the house, used for boiling water, to be employed, and a quart of water to be measured and brought to the "boil" in the usual way—the cock being full open.

One (or all) of the ring-burners on the cooker hot plate to be tested for the consumption, through a properly regulated and tested test-meter, and the consumptions noted.

A sample of the gas supplied to the cooker, to be taken in bottles, by each principal and his deponent.

The calorific value of the gas to be ascertained, on basis of analysis. Each sample to be analyzed by different individuals, and the tests to agree.

The fitting to which the nipple on the cooker is attached to be sealed by each principal, and then the cooker to be removed to the gas-works, or other approved place, where the test is to be repeated with 350 gas.

The kettle used by the house to be borrowed for the time being.

The principals to have the right to make each test themselves, before the joint referees, or to repeat a test; and in case of any dispute the referees to decide which test is to be taken as correct.

The method of mixing the 350 gas shall be by diluting down a 500 net (or a richer) gas with air or nitrogen, or both, at the discretion of the principals.

When six tests have been made of six different cookers, if all six are reasonably comparative—so that the six tests represent a fair average—this shall be taken as conclusive in regard to that town.

If, however, the results are such that the average cannot be fairly taken, further cookers (up to any number approved by the referees) shall be tested with a view to discovering the average cooker result.

Likewise, with the six towns selected, if there be found a considerable difference in the results, further towns shall be taken.

The results of the tests made to be signed by the parties concerned, and advertised in the Technical Press.

(Signed) GEORGE HELPS.

P.S.—I am extremely sorry about the delay in writing to you, which has been quite unavoidable.—G. H.

Letter from CARR to HELPS, dated Dec. 14, 1918.

Dear Sir,—Your letter, dated Dec. 12 (which has taken you seven weeks to submit), is before me.

The conditions you are now seeking to impose, I regard as an obvious attempt to evade the issue between us, as you are well aware that the financial aspect of your suggestions would render the whole thing an utter impossibility. In addition to this, the conditions are absurdly unnecessary.

In your communication, you elect to ignore my letter dated Oct. 26, confirming my verbal acceptance of your challenge on Oct. 25 [see "JOURNAL" for Nov. 5]. If you will refer to this, you will find that I have deposited with the President of the Manchester District Institution of Gas Engineers the sum of one hundred guineas, which is awaiting the deposit of a like amount by you.

The question of the details of the comparative tests must be left to the Committee of the Institution; and I reiterate that neither you nor

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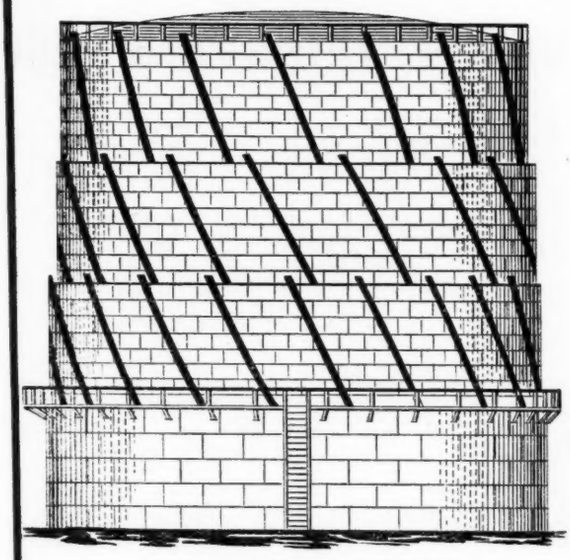

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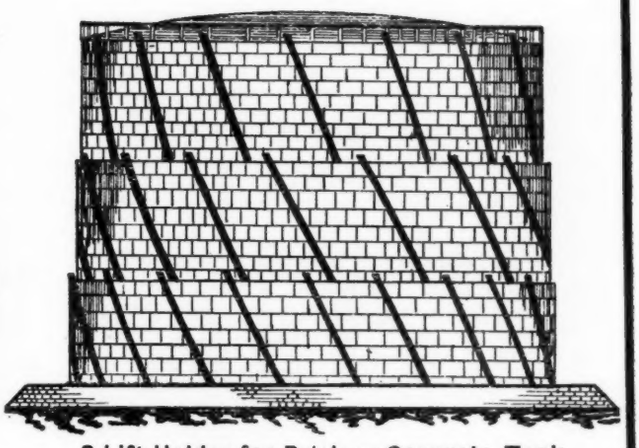
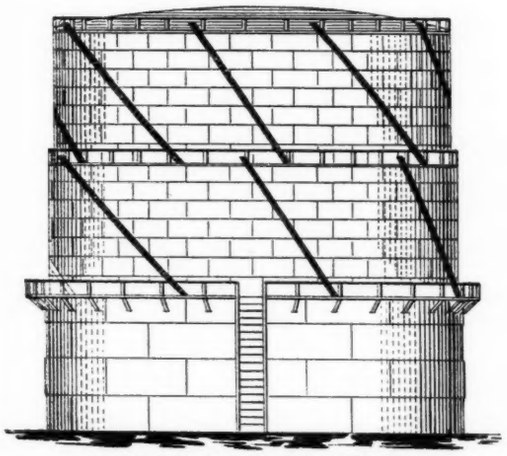
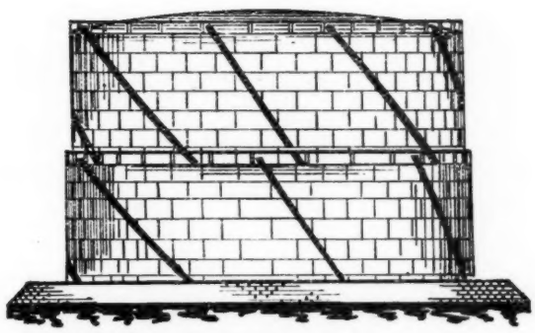


3 Lift Holder for Brick or Concrete Tank.
99' 0" Diam., 24' 6" Deep.



2 Lift Holder for Steel Tank.
107' 6" Diam., 30' 0" Deep.



Lift Holder for Brick or Concrete Tank.
107' 6" Diam., 30' 0" Deep.

The 2 Lift Holders can be converted into 3 Lift if so required, and would then have a capacity of 780,000 c. ft.

ALSO HOLDERS OF 20,000 & 30,000 C. FT. CAPACITY.

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Telegraphic Address
Inland: "Metrogas, Peck. London."
Foreign: "Metrogas, London."

I can have any part in any demonstration other than that of defraying the cost, in accordance with the results.

I am sending copies of your letter and my reply to the President, and trust you will not consider it necessary to address any further communication to me direct.

(Signed) ISAAC CARR.

Letter from HELPS to CARR, dated Dec. 17, 1918.

Dear Sir,—I am in receipt of your letter of the 14th inst., and in reply thereto I would point out :

1. That I have written to you on two occasions regretting the unavoidable delay in dealing with your acceptance of my challenge.
2. That I have received no communication whatever from you on the subject ; and that I am, therefore, justified in ignoring any letter that you send to the Press, unless I receive a copy of such letter from you direct.
3. That I claim to be entitled to a voice, on equal terms with yourself, in the selection of any committee by whom the necessary investigation is to be controlled or undertaken.
4. That I claim the right to be present at all the meetings and tests that may take place in connection with the matter.
5. That I am not disposed to deposit my hundred guineas with any referees that are not appointed by us jointly.

If you do not agree to accept the conditions above set out, I will call in a chemist of unquestioned repute in the gas industry, and get him to undertake a series of tests, which he shall publish. And you may then make your comments thereon, and lay claim to having won, or acknowledge having lost, the challenge—as the case may be. But that this matter shall be put thoroughly to independent proof, you need have no fear. The public will give both of us fair play.

I am sorry to have to address another letter to you ; but seeing you are a principal in the matter, and have not named anyone to act for you, I have no alternative.

I have nothing but the greatest respect for Mr. Leather, the President of the Manchester District Institution ; and I am sure he will understand my attitude.

(Signed) GEORGE HELPS.

Letter from CARR to HELPS, dated Dec. 20, 1918.

Dear Sir,—I am in receipt of your letter of the 17th inst., and desire to observe that I have not appointed any referee.

The matter of difference between us arose in the proceedings of the Manchester District Institution of Gas Engineers ; and, so far as I am concerned, the difference (until it is disposed of) will remain a matter for the Institution.

The Committee of the Institution can be trusted to call in "a chemist of unquestioned repute in the gas industry" to undertake the work of the comparative tests.

If you are sincere in your challenge, send your money, and suppress yourself until the demonstration is made.

On the "camouflage" with which you conclude your letter, please note that any tests initiated by you will neither concern nor interest me.

I trust that I have now made myself sufficiently clear as to render it unnecessary for you to address any further communication to me.

(Signed) ISAAC CARR.

Letter from HELPS to CARR, dated Jan. 6, 1919.

Dear Sir,—I have your letter of the 20th ult.

I am afraid that you have not understood either of my letters.

You surely know that in all such matters as that we are concerned with, it is usual for both parties to agree as to stakeholder and referees ; and if you are not prepared to admit this, I am afraid I shall have to forego the pleasure, at the moment, of demonstrating to you a fact which would enable you to sell heat energy more cheaply than even you have ever done before at Widnes.

(Signed) GEORGE HELPS.

Letter from CARR to HELPS, dated Jan. 8, 1919.

Dear Sir,—I am in receipt of yours of the 6th inst., and regret that you should have thought it necessary to address a still further communication to me.

With regard to your statement that I have not understood either of your letters, will you permit me to say that these are incapable of being misunderstood, as they, together with your present communication, are obvious attempts on your part to evade the issue between us.

I stated in my letter, published in the "Gas World," Nov. 2., and the "Gas Journal," Nov. 5, that your contention is a physical impossibility.

The difference is one capable of easy demonstration, and must be carried out by an independent expert to be appointed by the Committee of the Manchester District Institution of Gas Engineers.

Once again I say, if you are sincere in your challenge, you can have no objection to this course.

This is the last letter I will willingly write you direct.

(Signed) ISAAC CARR.

Letter from HELPS to CARR, dated Jan. 11, 1919.

Dear Sir,—I quite appreciate the fact that you consider that what I have stated can be done is a physical impossibility, and this is the reason for our present correspondence. For my part, I know that if I can convince you, I can convince the whole industry ; and this is what I am out to do. Whether it costs me a hundred guineas or not, is a matter of little or no consideration whatever. I wish you would look at the matter in this way.

Now you know that the first thing to be done is for reference to be made as to what tests are to be carried out and what they are to prove. This necessitates a reference being drawn up. I submit to you again that it is altogether unreasonable, and outside the pales of fair play, for you alone to nominate the people who are to draw up this reference and carry out the tests.

The matter is too important both to the industry and the country for me to run any risks of the tests, &c., being carried out without my having even a voice in the selection of those who are to carry them out ; and I cannot accept your proposal.

I refer you to my letter of Dec. 12, in which I have asked you to agree that a committee be appointed, and that each of us nominates half the members who serve on the committee ; and that this number nominate a chairman or umpire. Surely you are not going to continue to argue that this is not a reasonable proposal.

I submit to you that in the interests of the issue at stake—apart from any personal feeling at all, I am entitled to what I ask for. But I am quite prepared to consider any modification of my proposal that you may see fit to make—provided that it does not prejudice the finding of a true solution of the question between us.

You may have noticed that I do not take seriously various remarks contained in the several letters you have addressed to me, which might have been construed as personal and somewhat abusive, as I feel you are too much of a gentleman to act towards your opponent, whoever he may be, with anything but the greatest courtesy.

If you have made up your mind that you, and you alone, are to dictate to me the people who shall carry out the tests, and the methods to be adopted by these people, I have nothing more to say to you so far as my challenge is concerned. But I shall see that the statements which I have made and which you question are proved one way or the other with or without your help ; and I will endeavour to find some man in the industry—if possible someone connected with your town—who will put his one hundred guineas down against mine, on the same conditions that I have put to you, and that I consider I am entitled to, so that the tests may be made in spite of the impossible attitude which you have seen fit to take up with me in the matter.

I shall be glad to hear from you as to whether you accept or do not accept the proposals I have made. "Yes" or "No" is all I ask for.

(Signed) GEORGE HELPS.

Letter from CARR to HELPS, dated Jan. 14, 1919.

Dear Sir,—Loth as I feel about addressing you again, I am constrained to say that there is no point in your letter of the 11th inst. which has not already been dealt with by me.

(Signed) ISAAC CARR.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Last Saturday (with the permission of the Admiral in Command), Mr. J. Campbell, the Engineer and Manager of the Dunfermline Corporation Gas-Works, invited the members of the Association to visit H.M. Dockyard at Rosyth. The visitors, to the number of about thirty, under the leadership of Mr. R. Waddell (the President), met at the gas show-rooms, Dunfermline, where they were welcomed by Mr. Campbell. After inspecting the fitting-shop, the members proceeded by special tramcar to the dockyard, where they were permitted to board H.M.S. "Canada," and see the various guns, &c.

The party then returned to Dunfermline, where they were entertained at tea by the Dunfermline Corporation in the City Hotel. Bailie Kenny, a member of the Gas Committee, welcomed the Association to Dunfermline ; and Mr. Waddell, on behalf of the members, thanked the Corporation for their hospitality. Mr. Campbell was specially thanked for his trouble in arranging the visit to the dockyard.

Benzol without Licence.—The Board of Trade have decided that benzol may, until further notice, be purchased for use in motor vehicles without the production ot a motor spirit licence.

Coke-Fired Boilers.—Tests carried out by the London Hydraulic Power Company show considerable economy when coke is mixed with the coal for its water-tube boilers. Coke was added in proportions of from 30 to 75 p.ct. The steaming capacity of the boiler was increased by over 20 p.ct. ; and the over-all efficiency rose from 61 to 70 p.ct.

Military Censorship of the German Technical Press.—The "Journal für Gasbeleuchtung" opened its issue of Dec. 21 last with an editorial announcement, recording the removal of the German military censorship, which extended to technical-scientific publications, and stating that the removal will admit of the communication now through its pages of many matters which were common knowledge in war-time among German technical men, but of which it could take no notice hitherto. Having been blamed by many readers for its apparent remissness, it takes the opportunity to explain that the Bavarian Press censorship, to which it was subject, was especially stringent and unintelligent—anything relating to benzol, tar (low-temperature tar in particular), ammonia, &c., being forthwith banned. Reports from other papers—even abstracts from English technical journals on ammonia and low-temperature tar, which obviously contained nothing unknown to the enemies of Germany—were forbidden. The publication of much of the matter thereby held over will, it says, now be put in hand as quickly as possible, having regard to the paper shortage ; and a beginning is made, in the same issue, with a communication from the Chemist at the Mannheim Gas-Works dealing with the manufacture of sulphate of ammonia. Some points from this paper will be referred to in an early issue of the "JOURNAL."

THE ESTIMATION OF BENZOL IN GAS.

The circumstances of the war in France, no less than in this country, having called for the extraction of benzol from gas, the method of estimating the quantity of residual benzol in gas devised by M. St. Claire Déville, and employed by the Paris Gas Company, has required revision, inasmuch as the method is not usefully applicable to gas containing benzol below a certain minimum. M. Déville, at a recent meeting of the French Commission charged with the removal of benzol from gas, described a method worked out by him, and in use during the war, for the estimation of such small proportions of benzol but applicable also to gas containing any quantity of it. The following description of the method is translated from the "Journal des Usines à Gas" of Dec. 20.

The method of estimating benzol in gas practised for a long time past in the La Villette experimental works of the Paris Gas Company consists, as is well known, in cooling the dried gas to the temperature of −21·7° C. by means of a mixture of ice and salt, weighing the condensed benzol, and adding a constant of 23·5 gm. to the figure obtained for the benzol in 1 cb.m. of the gas. The estimations made by this method since 1883 have amounted to tens of thousands. In the course of experiments made in connection with the method in 1883-4, it was clearly shown that the vapour-tension of benzene (and *à fortiori* of other aromatic hydrocarbons) becomes practically *nil* before reaching −60° C., when the gas is progressively cooled to this temperature. As a result, if the temperature is lowered to −72° C. (as can easily be done by means of carbonic acid snow) there is no question but that all the benzol vapours are condensed. Thus an obvious method of estimating benzol in gas consists simply in weighing the portion condensed at −72° C.

It is clear, moreover, that in the use of the former method the addition of the constant 23·5 gm. is permissible only when the gas contains at least a little more than 23·5 gm. pure benzene, after the abstraction of toluene, xylene, &c. In the case of gas from ordinary coal, this condition is invariably fulfilled; but with gas produced towards the end of the carbonization, with debenzolized gas, &c., this is not the case, and the use of the direct method of cooling to −72° C. is necessary. As far back as 1891, M. Déville had studied the estimation of benzol in such poor gases. At this time, however, the vacuum flask invented by Professor Dewar, and since familiar as the thermos flask, was not known, and the operation of direct cooling presented so many practical difficulties that the process of cooling to −21·7° C. with addition of the constant was retained for gas from ordinary coal. These difficulties having been removed, the method of direct condensation of benzol at −72° C. was adopted by the Paris Gas Company immediately the removal of benzol from gas was put into practice. In the course of the three years which have elapsed, the *modus operandi* has been closely studied and successively improved. The apparatus employed in carrying out the process is shown in the accompanying diagram.

The apparatus being arranged as shown in fig. 1, the tap r^1 is opened fully and the tap by which the gas to be tested enters, is turned so as to obtain at the outlet of the meter a small flame consuming about 50 litres per hour. After the lapse of a few minutes, the condensing tube is closed, placing first on the outlet and then quickly on the inlet the two small caps O and O^1. The tube is then removed by slipping it through the stopper B, and is weighed full of dry gas at the temperature and pressure of the laboratory and with the two caps attached to it. After the weighing, it is replaced in the stream of gas, and the flame again lighted at the outlet of the meter.

The preparation of the cooling mass of carbonic acid snow is easily done. The cylinder of liquid carbonic acid is placed on its inclined support, and the linen bag S, closed below by a simple knot, is tied in the same way to the stem of the cylinder. The valve P is then cautiously opened. A jet of liquid carbonic acid is precipitated into the bag and condenses there as snow. This operation is repeated until by tapping the bag, it is judged that a sufficient quantity of the snow has been accumulated. The valve P is then finally closed; the bag detached from the cylinder; and the contents emptied on to a square piece of canvas on one of the laboratory tables.

The large cylinder E is then taken, the stopper B removed and replaced by a wide-stemmed funnel. Then small lots of the carbonic acid snow are introduced (by means of a wooden spoon) into the Dewar tube D alternating with a few c.c.s of acetone. The mixture is stirred with a wooden stick, and the successive additions made so as to fill about nine-tenths of the vessel D with a stiff paste. The stopper B is then put in place, and the cylinder E and its contents put in position in the train of apparatus shown in fig. 1. The tap r^1 is closed, and the fingers of the meter set to zero. It now only remains to insert the tube into the paste by sliding it through the stopper B. This having been done, the tap r^1 is opened, the burner is lighted, and the test is begun.

It may be reckoned that the cooling tube will remain for at least five hours at a temperature sufficient to condense the benzol from the gas. At the Villette experimental works, the special alcohol thermometer used for the test registers − 81° C. in the paste at the beginning of the test and from − 70° to − 72° C. at the end of four to five hours. For gas from ordinary coal it is customary to treat from 150 to 200 litres of gas within a little more than three hours. In the case of gas from which benzol has been extracted, it is advisable to treat as large a volume of gas as possible, and therefore necessary to prolong the operation. The accuracy of the test is obviously in proportion to the absolute weight of benzol which is condensed. If, as is sometimes the case (especially with rich gas), the benzol which freezes in the upper part of the tube tends to choke the latter, the operation is stopped; since, in such cases the quantity of benzol will be invariably sufficient.

When it is judged that the time has come to stop the test, the tap r^1 is closed, and a note made of the barometric pressure and of the temperature indicated by the thermometer *t* (fig. 1). Then, by means of tables or a slide-rule, the volume of gas read on the meter is reduced to 10° C. at 760 mm. The two caps O and O^1 are then quickly replaced on the tube, and the latter withdrawn from the Dewar flask along with the stopper B, which latter is afterwards taken off. On the apparatus having come to the temperature of the laboratory, the rubber tube of the cap O (the inlet side) is pinched for an instant in order to allow the escape of the excess of gas confined in the tube as a result of the low temperature when the tube was sealed. The benzol having become liquid, its volume is noted on the graduated flask of the tube; the latter being then weighed after careful wiping.

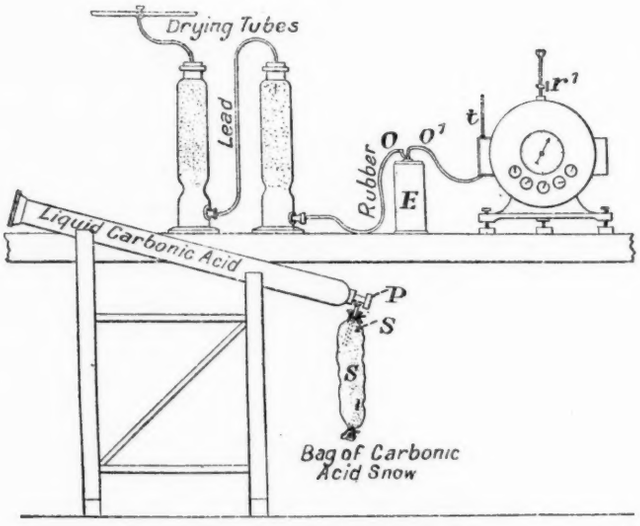

Fig. 1.—Diagrammatic Sketch of the Apparatus.

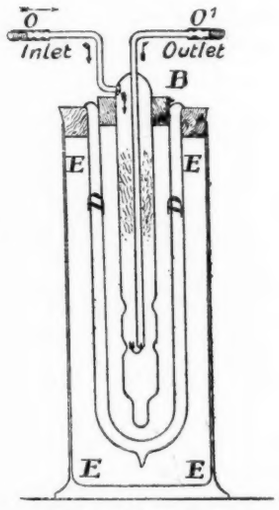

Fig. 2.—Section of Vessel E in Fig. 1.

[In Fig. 2, E is the protecting cylinder: D, the exhausted chamber of the Dewar flask; and B, the stopper supporting the condensing tube. The space between the exhausted receptacle and the condensing tube is occupied by carbon dioxide snow, which at the commencement of the test measures 150 c.cs. The capacity of the condensing tube to the under surface of the stopper B is 50 c.cs.]

An example may be given of the calculation of the weight of benzol per cubic metre (at 10° C. and 760 mm.) of gas which passes through the apparatus.

Tests of Normal Gas from No. 38 Coal (Boldon, September, 1918).

Weight of benzol collected (P)	6·229 grams
Volume of gas read at meter	150 litres
Temperature (t) of gas	19° C.
Barometer reading (H)	762 mm.
Volume to 10° C. and 760 mm.	145·80 litres
Volume of benzol vapour extracted from gas at the rate of 1 litre per 3·73 grams benzol $\left(\frac{P}{3{\cdot}43}\right)$*	1·67 litres
Total volume of gas treated (V)	147·81 litres
Weight of benzol per cubic metre of gas (at 10° C. and 760 mm. $\frac{1000\ P}{V}$	42·24 grams

* It is assumed that the weight of a litre of benzol vapour from gas is equal to that of a mixture of three volumes of benzene and one volume of toluene (approximate estimate).

At the end of the operation the mixture remaining in the Dewar flask has the appearance of a clear liquid at the boil, in consequence of the disengagement of carbonic acid. Its temperature is very close to − 72° C. On the day following the test, the carbonic acid having disappeared, there remains only the acetone in slight admixture with water. It is put aside, and when a sufficient quantity of it has accumulated it is regenerated by distillation; the portion distilling below 56° C. being collected.

It has been assumed that the tube is traversed by gas at the rate of 50 litres per hour. This rate is convenient, since it allows the operator to devote a few minutes to the estimation of benzol at the beginning and at the end of an afternoon, leaving him, in the interval, time to carry out the other operations required for the complete analysis of the gas. But the gas can be passed at a considerably faster rate, and the estimation may be completely carried out within about 1½ hours. It has been found that a rich gas passed through the apparatus at the rates of 53 and 120 litres per hour gave results as follows: At 53 litres, 43·9 grams; and at 120 litres, 43·7 grams of benzol per cb.m.—that is, a correspondence within nearly ½ p.ct.

In allowing to escape from the tube the 20 odd c.c.s of gas confined in it at the excess of pressure due to the rise of temperature from the cooling mixture, a very small error is committed. A simple calculation, which it is not necessary to detail, shows that the absolute figure of this error varies from 3 to 5 milligrammes, according to the temperature of the laboratory. It is independent of the quality of the gas. The relative error is inversely proportional to the weight of condensed benzol; but it is always negligible.

The two calcium chloride drying tubes (fig. 1) should suffice for the perfect desiccation of the gas. In no circumstances should the least appearance of drops of water at the bottom of the tube be discernible. Should such be the case, after a given number of estimations, the second tube should be made the first, and the first transferred to the second place, after having been newly charged with calcium chloride freshly calcined at a dull red heat.

As regards the consumption of liquid carbonic acid, the commercial cylinders contain each 10 kilos of the liquid acid. With a little skill it is easy to avoid making more of the snow than is required for a test; and if this is done, a cylinder of the acid is enough for from eight to nine estimations.

From April 11 to Oct. 2, 1918, forty-one tests were made by the experimental works. The benzol condensed in the course of these tests was analyzed by distillation, and the following figures were obtained:

Benzol condensed at 72° C.	Volume treated	0·400 litres
	Weight	353 grams.
	Density	0·8825

Composition after allowance for 2·7 c.p. of loss:

Boiling below 80° C.	1·75
,, from 80 to 84° C.	79·48
,, ,, 84 ,, 90° C.	8·29
,, ,, 90 ,, 100° C.	2·62
,, ,, 100 ,, 115° C.	3·93
,, Above 115° C.	3·93

The weight of this benzol extracted from 1 cb.m. of gas (at 10° C. and 760 mm.) is as an average 37·71 grams. It is interesting to compare these results with those obtained in the course of a very long series of tests made in 1888 on the average gas of the La Villette works; estimating the benzol by the former method at − 21·7° C. with addition of the constant 23·5 grams.

Weight of benzol per cb.m. of gas, 39·7 grams. (including the 23·5 grams. of benzol condensable between − 21·4 and − 70° C.).

Composition of total benzol	Boiling below 80° C.	2·20
	,, from 80 to 84° C.	75·90
	,, ,, 84 ,, 105° C.	9·61
	,, ,, 105 ,, 111° C.	5·81
	,, ,, 115 ,, 165° C.	5·76
	Viscous residue	0·72

It would thus seem that the gas of La Villette in 1888 was slightly richer in benzol, and that this benzol contained a little more toluene and heavy aromatic hydrocarbons. There would be nothing surprising in this. In 1918, the experimental works distilled chiefly coals of which the gas is relatively poor in benzol. Moreover, abrupt condensation is practised at the present time, and has, as a result, the slight enrichment of the tar in benzene, and particularly in toluene. On the other hand, in 1888 the La Villette works carbonized much richer coals and even some cannel coal, and condensed the gas partially in the heat. It is only since April 11, 1918, that the tests of coal at the experimental works, interrupted since the beginning of the war, have been again undertaken. Up to this date, the estimations of benzol at − 72° C. have been made only on crude or debenzolized gas at the La Villette works. Since the commencement of these experiments, it has been found that the benzol was not entirely in the crystalline state in the condensing tube. A small quantity was in the liquid state, and found its way to the bottom of the tube. It seems quite natural to assume that this small liquid fraction was toluene, the freezing point of which is − 93·4. The tube has therefore been made with graduations of one-tenth of a c.c. on its lower part.

At the moment when the apparatus is withdrawn from the Dewar flask, the volume of liquid v in the lower part of the tube is quickly noted. When the whole of the benzol is melted, the total volume V is noted; and it is then assumed that the ratio v/V affords an approximate idea of the proportion of toluene in the benzol from the gas under test.

But when, in April, 1918, tests were made on normal gas from the old type of furnace containing seven 3-metre retorts at the experimental works, it was found, with some surprise, that no trace of products remaining liquid at − 72° C. could be detected in the condensing tube. It was first assumed in explanation that, as the normal gas was appreciably richer in benzol than those previously examined, the crystallized mass of pure benzene would envelope the drops of toluene too rapidly to permit them to flow down the walls of the tube. In order to verify this hypothesis, tests were made on gas of a very poor coal and on that of a relatively rich coal; the gas being passed at the reduced rate of 20 litres per hour, thereby considerably diminishing the formation of benzene crystals. The poor gas under these conditions did not give more liquid than at the normal rate; but traces were observed in the case of a rich gas. Hence it follows that the rapidity of formation of the benzene crystals plays an infinitesimal part in the phenomenon. But the absence of liquid toluene in the gas of the experimental works is evidently chiefly due to the fact that in 1918, as in 1888, the gas of the La Villette works contained more toluene than the actual gas of the experimental works; the difference being assignable only to the method of condensation. Hence the toluene lacking in the gas of the experimental works is not lost, but is found in the tar.

As a general conclusion from the numerous experiments made throughout forty years, it may be said that the quantity of benzol produced in the distillation of gas coal of average quality is about 12 kilos per tonne of coal. Of the 12 kilos, 11·4 kilos, or 95 p.ct., remain in the gas, and 0·6 kilos in the tar. These figures vary, within very narrow limits, according to the quality of the coal, the temperature of condensation, and the time of year.

In conclusion, M. Déville makes reference to the method of determining the quantity of benzol devised by Mr. T. F. E. Rhead,* and consisting of washing the gas with anthracene oil in a small laboratory scrubber. M. Déville expresses himself as inclined to dissent from the assumption of Mr. Rhead that the absorption of benzol by the oil is complete. He has ground for believing that it is not always complete, and that the Rhead apparatus estimates not the benzol in the gas but the quantity retained by the oil. If two simultaneous estimations were made by the Déville method—one at the inlet and the other at the outlet of the apparatus—the content of the initial gas, that of the emergent gas, and, by difference, the percentage removed by the oil, would be exactly ascertained, and such operations would be exceedingly informative. By varying successively, while keeping other conditions the same, the nature of the oils, the quantity per cubic metre of gas, the temperature of the apparatus, and also the degree of moisture of the gas, the correct conditions for the maximum efficiency of an industrial washer would be ascertained. It is certain that the Rhead washer could replace with advantage, from this point of view, the three Wolff flasks employed in 1915 in the laboratory of the La Villette experimental works in order to represent, in this description of experiment, the washer used for the removal of benzol in the works of the Paris Gas Company. M. Déville concludes that, as a method of estimating benzol in gas, the one which he describes is infinitely more rapid and more certain than that of Mr. T. F. E. Rhead.

* See "JOURNAL" Vol. CXXXVII., p. 207.

Pipe Bender.

In the "Electrical Review" (Chicago) for Nov. 30 last, there appeared an illustrated description of a new pipe bender manufactured by the American Pipe Bending Machine Company, of Boston, which enables 6-in. iron pipes to be bent cold. A 90° cold bend may be made in a 6-in. iron pipe in 9½ minutes with six labourers handling the lever of the machine. The bends are as perfect as those done by any other process, and are made at a labour cost of $1.50; whereas the average charge for making similar bends by other processes is about $25, and several hours are required for the work.

A New German Benzol Trust.—Under the name of "Firma Benzolverband," nearly all the benzol-producing works in Germany and Austria have combined to form a new trust with head offices at Bochum. The trust came into working on Jan. 1.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Estimating Benzol in Coal Gas.

SIR,—At the end of the article in your present issue, on work done by M. St. Claire Déville, concerning the estimation of benzol in gas, reference is made to the method dealt with by the writer in a paper on "Some Sources of Benzol and Toluol for High Explosives" [see "JOURNAL," Vol. 142]. Déville assumes that the writer claimed to estimate absolutely the amount of these bodies in the gas.

Reference to the paper will show that no such claim was made. The apparatus furnished very satisfactory data of the maximum possible amount of benzol, &c., which could be recovered in works' practice with the oil-washing process under practical conditions. That no appreciable amount of these bodies was retained by the gas was shown by the fact that a weighed amount of creosote oil, having negligible volatility at ordinary temperatures, did not increase in weight when the washed gas was passed through it.

From theoretical considerations, it would appear possible—using creosote oil (say) as the washing medium on the countercurrent principle—to dissolve-out all but a trace of the benzol, &c., originally in the gas.

Déville gives no figures indicating what proportion of the benzol he found in the gas at the outlet of the oil-washer described by the writer; and it would be interesting and useful to have a series of tests on the lines he mentions. In considering the method of testing the efficiency of industrial benzol-recovery plant, the freezing method was discussed; but it was considered likely to prove too severe a test, in that it would completely recover the more volatile vapours as well as benzol, whereas it would be unreasonable to expect the industrial oil-washing process with subsequent steam distillation to effect such complete recovery.

T. F. E. RHEAD.

Laboratory, Nechells Gas-Works, Birmingham, Feb. 7, 1919.

Gas Water-Heaters and Water Regulations.

SIR,—We fully endorse the remarks in your issue of the 14th ult., respecting the restrictive effect of many water regulations, which has called for much ingenuity on the part of geyser manufacturers in designing appliances which conform to these various requirements. This ingenuity, however, cannot be exercised in such a case as mentioned; where a regulation definitely stipulates that if a storage of hot water is required the quantity must not be less than 30 gallons. What is really wanted in a small house is apparatus that will quickly furnish about a gallon of really hot water at intervals throughout the day, and when required, a total quantity of 12 or 13 gallons—sufficient, with the addition of cold water, for an ordinary bath, and capable of heating a further 12 gallons while the bath is in use. Such an apparatus is made, and must be plainly much more economical than a system which compels the heating of 30 gallons of water—with its consequent consumption of fuel for heating and maintenance—when probably 2 gallons would be sufficient.

Hot water supply is being made one of the most important features of Government housing schemes; and its provision on the most economical lines—both for installation and use—is the subject of a great deal of interest at the present time. Gas appliances—working independently of, or in conjunction with, a coal-heated fire—can play a leading part in this development, providing they are not handicapped by regulations framed to suit a less "flexible" fuel; and we suggest that it should be considered whether steps cannot be taken to obtain some relaxation of regulations which are not in line with present-day conditions.

THE PARKINSON STOVE COMPANY, LTD.

Stetchford, Birmingham, Feb. 10, 1919.

Wages Arbitration Case at Bury.—The Court of Arbitration have had submitted to them a question as to whether certain advances received by members of the National Union of Clerks employed by the Bury Corporation in their gas and electricity departments were merit, service, or cost of living advances respectively. The point arose out of an award of the Committee on Production of specified weekly bonuses; any advances (other than service increments or advances for merit) given since Jan. 1, 1917, to merge in these amounts. In July, 1917, the Corporation granted advances varying in extent to all the Union's members; and the Union contended that these were merit advances by reason of the varying amounts, and so should not have been merged in the advances granted under the award. The Corporation, on the other hand, maintained that they were war wage advances in response to an application made by the Union. The Court of Arbitration have decided in favour of the latter view.

Condition of the Teignmouth Gas-Works.—The Teignmouth Urban District Council have discussed the question of the condition of the gas-works and the recent failures of the supply of gas. Mr. Pratt (the Chairman of the Gas Committee) said the Committee were agreed that it would be necessary to do something drastic, if they were to ensure a constant supply. The whole of the plant was in a dilapidated condition; and its repair would cost a large sum, and would then leave them with only part of what needed to be done. It would be well for the Committee to go thoroughly into the matter, and decide upon a scheme. Mr. Valentine remarked that he had been astonished to see the dilapidated and dangerous condition of the works. When he was Chairman of the Gas Committee, he visited the works on several occasions; but the late Manager did not call his attention to anything wrong, or consult him as to remedying defects. If the works were reconstructed, they might save in cost of labour alone one-half the charge for the new capital. After further remarks, it was decided that the Gas Committee should further consider the matter and present a report.

APPLICATIONS FOR PATENTS.

[**Extracted from the "Official List" for Feb. 5.**]

Nos. 1925-2598.

ACLAND, F. E. D.—"Carbonization and destructive distillation of carbonaceous materials." No. 2240.
AKT.-GES. BROWN, BOVERI, ET CIE.—"Jet apparatus for gaseous fluids." No. 2237.
BALL, F. W.—"Gas lamps or lanterns." No. 1976.
BEST AND LLOYD.—"Taps or cocks." No. 2228.
BILLINGTON, W. J.—"Devices for controlling gas and air." No. 1954.
BLAKELEY, W.—"Separating coke from clinker, &c., having different specific gravities." No. 1932.
BYRON, T. H.—"Desulphurizing oils." Nos. 2388, 2579.
CARPENTER, C. C.—"Operation of horizontal retorts." No. 1983.
CHANDLER, D.—"Gas-furnaces." No. 2097.
CHANDLER, D.—"Grillers for gas-cookers." No. 2098.
CUTHBERTSON, R. W.—"Apparatus for mechanically handling coke from coke-ovens." No. 2324.
DICKIE, W.—"Fluid cock." No. 2336.
EDWARDS, W. E.—"Fractional distillation plant for coal tar, hydrocarbons, &c." No. 2073.
EVANS, E. V.—"Manufacture of ammonium sulphate." No. 2379.
EWART, J. W.—"Gas and water valves for water-heaters." No. 1972.
FIELD, W. G.—"Gas or vapour burners." No. 2473.
FIRTH BLAKELEY, SONS, & CO.—"Doors or lids of vertical retorts." No. 2043.
FLETCHER, J. Y.—See Ball. No. 1976.
FRANKLIN, G.—"Gas-fires." No. 2453.
GALLEY, W. G.—"Means for collecting and storing a proportion of combustible mixture supplied to internal combustion engines." No. 2315.
GARROW, J. R.—See Acland. No. 2240.
GREEN, W.—"Process of distilling or recovering volatile inflammable liquid solvents." No. 2482.
GREGSON, W.—"Gas-heated furnaces." No. 2543.
HARGREAVES, F. J.—"Photometers." No. 2094.
HEELEY, G.—"Coke-quenching devices." No. 2013.
HENRIX, G. A. H.—"Devices for lighting gas." No. 2350.
HERSEY, M. H.—"Gas cooking and heating stoves." No. 2520
HOLLINGS, H.—See Evans. No. 2379.
HUMPHRYS, N. H.—"Gas-generating apparatus." No. 2592.
INDUSTRIAL INVENTIONS, LTD.—"Incandescent gas-lighting apparatus." No. 2474.
KENNEDY, J. E.—"Rotary retorts, and destructive distillation of carbonaceous material therein." No. 2249.
KILBURN, B. E. D.—"Valve mechanism for internal combustion engines." No. 2037.
KING, J.—See Gregson. No. 2543.
KING, TAUDEVIN, AND GREGSON.—See Gregson. No. 2543.
KITCHING, C. H.—"Supporting-means for light-diffusing shades." No. 2542.
LEWIS, W. K.—See Green. No. 2482.
M'HARRY, W.—"Gas-producers, &c." No. 2036.
MOUSSIAUX, J.—"Automatic cleaning or clinkering of gas-producers." No. 2526.
NIELSEN, H.—See Acland. No. 2240.
PEARSE, A. L.—See Kennedy. No. 2249.
PERRY, F.—See Industrial. No. 2474.
REGAN, J. E.—"Incandescent gas-burners." No. 2122.
SADGEBURY, H. F.—"Gas-mixing attachment for internal combustion engines." No. 2583.
SEGRÉ, M.—"Manometer for measuring level of liquid in a reservoir at a distance." No 1975.
SHAW, E. J. A.—See Firth Blakeley. No. 2043.
SOUTH METROPOLITAN GAS COMPANY.—"Gas-furnaces." No. 2097.
SOUTH METROPOLITAN GAS COMPANY.—"Grillers for gas-cookers." No. 2098.
SOUTH METROPOLITAN GAS COMPANY.—"Manufacture of ammonium sulphate." No. 2379.
STEWART, M.—"Gas-mantle saver." No. 2576.
SULZER FRÈRES SOC. ANON.—See Kilburn. No. 2037.
SUTCLIFFE, E. R.—"Method of producing activated carbonaceous substances, and product thereof." No. 2595.
SWINBURNE, J.—"Low-temperature destructive distillation." No. 2208.
SWINBURNE, J.—"Distillation of fragile fluids." No. 2210.
THORNTON, T.—"Combined gas or coal range, stove, or grate." No. 2172.
WALKER, J. H.—"Gas-pendants." No. 2535.
WILKES, F.—"Gas-heated hand-iron." No. 1945.
WILSON, J.—"Gas-burners." No. 2049.
WOOD, E A.—See Industrial. No. 2474.

Carbide and Nitrogen Products.—Shareholders of the Nitrogen Products and Carbide Company, Ltd., have received an intimation from the Directors that the conditions which the Norwegian Government put forward in connection with the proposed amalgamation of the Company with the Alby United Carbide Factories were of such a nature that they could not recommend their acceptance. Arrangements are, however, in progress which it is expected will render it possible to effect the amalgamation by about the middle of this year, on the lines of a scheme put forward last August. In the meantime, with this object in view, the Companies will work in the closest harmony. The scheme referred to provides for the increase of the capital of the Alby United Company by £1,625,000 to £2,350,000, partly by the capitalization of a portion of the reserve. The balance will provide shares to be issued to the shareholders of the Nitrogen Products Company in payment for their business and assets.

MISCELLANEOUS NEWS.

THE GAS LIGHT AND COKE COMPANY.

The Two Hundred and Twelfth Ordinary General Meeting of the Proprietors was held last Friday, at the Chief Office, Horseferry Road, Westminster—Mr. D. MILNE WATSON (the Governor) in the chair.

The SECRETARY (Mr. W. L. Galbraith) read the notice convening the meeting; and the seal of the Company having been affixed to the Register of Proprietors, the report and accounts were taken as read.

THE GOVERNOR'S ADDRESS.

The GOVERNOR: Ladies and Gentlemen,—With your permission, I propose to take the report and accounts as read.

THE GOVERNORSHIP.

Before proceeding to deal with them, I wish to refer to the retirement of Mr. John Miles from the governorship of the Company. Towards the end of last year, to the general regret of the Court of Directors, Mr. Miles announced that he felt that the time had come for him to seek relief from the responsible duties of Governor—a position which he had occupied since the death of Sir Corbet Woodall in 1916. The Directors are glad to say, however, that Mr. Miles has consented to remain on the Board, of which he has been a member for upwards of 21 years, and that his ripe knowledge therefore of the affairs of the Company will still be available. It is difficult to say all one feels about a colleague who is present; but Mr. Miles has earned a very high place in our regard by his sound business ability, level-headedness, geniality, and optimism. It was a pleasure to work under him. The Board have done me the honour of electing me in his place; and I need hardly say how much I appreciate the honour.

CESSATION OF HOSTILITIES.

The year that has passed has been a memorable one in the history of the Nation. The great war which afflicted the whole world has been brought to an end, and the nations are preparing for Peace. The cessation of hostilities came as a great relief to those responsible for the conduct of the business of this Company. We realize that this does not mean we have got into calm waters; but we feel that the uncertainty of the conflict is past, and that we can face the future with the knowledge that the great task of winning the war is behind us.

THE ACCOUNTS.

Dealing now with the accounts, we come first of all to the capital account. If you look at the expenditure shown in this account, you will find that it only amounts to a sum of £14,700. This is a low figure, because it has been found impossible to carry out any new work. All that was possible has been done to keep the existing plant in good condition. This has been a matter of great difficulty, owing to the shortage of material and labour. To the credit of the account, we have written-off plant to the extent of £108,000. This amount includes payments received in respect of lost ships. There is a credit also of £7000 owing to mains being thrown out of use, and £130,000 in respect of depreciation of meters and stoves. Added to these there are two items which I am glad to say seldom occur as a credit in this account—viz., meters and stoves returned from hire. This, so far as stoves are concerned, is due to the fact that, owing to the rationing of gas, consumers have returned a certain number of fires and cookers; and instead of an expenditure in this direction, which we usually look for on account of an increase of business, we have a credit in respect of the number which have been returned by the consumers. The reduction in meters (mainly automatic) is due to the difficulty of getting defective meters repaired or replaced. There are some 40,000 awaiting repair. The result of all these factors has been to increase the balance of the capital account, which at the beginning of the year was £509,000, to £767,000. Now if you will turn to the revenue account, you will see some very startling figures. The expenditure has gone up from £6,000,000 to £6,691,000—and this notwithstanding the fact that there has been, as the report shows, a shrinkage in the output of gas of 7 p.ct. The chief direction in which the expenditure has increased is, as might be expected, in the cost of raw materials and labour. Although we have used about 240,000 less tons of coal, the cost has been £3,155,000, as against £2,968,000—representing, as it does, an increase of 5s. 7d. per ton. Notwithstanding a large increase in the price of gas oil per gallon, there has been a decrease in cost under this heading, owing to the much smaller quantity of oil used than in the corresponding period. On the debit side of the account, you will find that item after item shows an increase, although, as I have already stated, business has fallen off. These increases, which appear under various headings—such as purification, repairs and maintenance of works, distribution, &c.—are due partly to cost of materials and partly to outlay for wages; and if you will look at the bottom of the page, you will see a note which shows that the total wages paid by the Company have increased during the year, notwithstanding the reduction of 7 p.ct. in business, from £1,525,000 to £1,862,000—an increase of £337,000, which is almost half the total increase of £690,000 in the expenditure of the Company. This shows what a tremendous effect the question of wages has on the cost of gas. It should also be pointed out that, notwithstanding this extra outlay, the Company has by no means been able to keep up with the work which ought to have been done. Had we been able, for instance, to repair meters and stoves on the district as we ought to have done, the increase of cost in respect of these two items would have been greatly exceeded.

THE PRICE OF GAS.

The result of this rise in the cost of raw materials and wages was that it became necessary to increase the price of gas at Midsummer to 4s. 4d. The rental of meters and stoves yielded slightly higher revenue. The rental of automatic fittings shows a decrease of £53,000. This is owing to the difficulty of changing the wheels in the automatic meters when the price of gas was raised—in other words, the Company's automatic consumers, who are made up chiefly of the working classes, have benefited to the extent of £53,000.

RECEIPTS FROM BYE-PRODUCTS.

With regard to bye-products, we find there has been a decrease of £74,000 in the receipts. This was due to the reduction in the quantity of coal carbonized. It is interesting to note for the benefit of those who contend that gas companies should be able to live (so to speak) on their residuals, that even in these times, when residuals stand at higher prices than they have ever stood at before, they only contribute 61 p.ct. to the cost of the coal to the Company; whereas in 1913 they contributed 79 p.ct. This is due to the fact that the Government have controlled the prices of our residual products more severely than they have controlled the price of our principal raw material, coal. It will, no doubt, interest the shareholders to know that during the war the country has been very largely dependent on the bye-products of gas manufacture for the supply of explosives. Lord Moulton, the Director of Explosives Supply, has said that, had it not been for the gas industry, the country would not have been able to carry on the war for any length of time. The Company's bye-products department has taken a leading part in the supply of raw materials for explosives manufacture; and the plants which have been erected to the designs of the Company's staff have turned out very large amounts of material, especially during the early months of the war. The quantity of raw materials supplied, when turned into T.N.T., lyddite, and other explosives, would have been sufficient to fill no less than 160 million eighteen-pounder shells.

For fuel purposes, for the use of the navies and munitions works of Great Britain and her allies, 17 million gallons of oils have been supplied, and in addition 13,000 tons of disinfectant have been delivered. The hundreds of miles of roads constructed in France for the use of the armies have been almost exclusively made with road tar supplied by this Company—a quantity of over 5 million gallons having been delivered to the various Government departments.

RESULT OF THE YEAR'S WORKING.

The result of the Company's working for the year, after paying the half-yearly statutory dividend last June, and providing for all fixed charges, is that there remains a balance of £625,000. out of which the Directors recommend the payment of a dividend at the rate of 3 p.ct. per annum for the December half year on the ordinary stock of the Company. This will take £244,000, and leave £381,000 to be carried forward to the credit of the current half year, as against £251,000 at this time last year. The dividend paid for the year will, therefore, be an average of £2 19s. 4d. p.ct., which compares with £3 14s. 8d. p.ct. for 1917. It will be seen, therefore, that, although the total expenditure for the year has increased by nearly £700,000, which is largely due to wages, the rate of dividend paid to the ordinary shareholders has suffered a drop of 15s. 4d., or just over 20 p.ct. The amount paid to our workmen for the year has increased by £337,000; while the dividend paid to the ordinary shareholders has decreased by £125,000.

FINANCIAL HARDSHIPS AND THE COMPANY'S BILL.

At last year's general meeting the shareholders were informed that steps were being taken to promote a Bill for the purpose of obtaining a modification of the sliding-scale of dividend—a scale which was originally introduced, so far as this Company was concerned, in 1876, and modified thereafter on two or three occasions. The scale as it at present stands was based on pre-war conditions—conditions which were entirely different with regard to the value of money and the price of raw materials. The Company's Bill, in common with some twenty or so other Bills which had been promoted for a similar purpose, was held-up owing to the appointment by the Government of a Select Committee to consider and report upon the whole question. A great deal of evidence was laid before the Committee, showing the considerable hardship that was being inflicted upon the gas industry by being bound by pre-war sliding scales, which had been arranged under totally different circumstances from those at present existing; and it was proved that it was impossible for the gas industry to maintain the financial stability which is necessary to the successful conduct of public-utility undertakings. The Committee in their finding admitted that the companies had made out a good case, and that, unless Parliament modified the restrictions as to dividends, the financial stability of the undertakings would be seriously jeopardized. But, unfortunately, the Committee's ideas as to what would secure financial stability were very different from what is deemed necessary in business. They proposed that the companies should be permitted to pay a dividend of either half their standard rate of dividend, or of half their pre-war dividend, whichever might be the smaller. In the case of this Company, it meant that we should be unable to pay a dividend of more than 2 p.ct. Now this would have been a very severe blow to the Company, and would certainly have had the effect of making the public very reluctant in future to invest in gas stocks. The view that 2 p.ct. was a sufficient return from capital invested in public utility companies, while the State was paying 5 p.ct. or more, was very difficult to understand. The Board of Trade, however, felt that they had no alternative but to introduce a Bill embodying the finding of the Committee. Agitation was immediately started, in and out of Parliament, to obtain a revision of the decision of the Committee. The President of the Board of Trade very fairly left the matter to the House of Commons to determine; and, after discussion, the House decided, by a large majority, that the relief proposed by the Committee was insufficient, and ultimately substituted three-quarters for one-half—thus enabling this Company to pay 3 p.ct. per annum as a dividend on its ordinary stock. When the matter was before the House of Commons, it is interesting to record that Sir Albert Stanley remarked that—

> I think it is quite clear that, whatever relief is given to these undertakings, after the war it will be necessary for the Government to very seriously consider the whole situation, not only with respect to the undertakings now under discussion, but also with

regard to all statutory undertakings which are limited in their charges by Acts of Parliament, in some instances passed many years ago. After the war it is very likely that we shall be living under entirely different conditions, and therefore it will be necessary to consider whether the basis upon which statutory limitations have been established are, under the altered circumstances, reasonable and fair.

This matter is now being followed up in order that the gas industry may in the future be put upon a sounder financial basis than at present. Owing to the action which the Government took in the matter, it was not necessary for the Company to retain the clauses relating to financial relief in its own Bill. They were accordingly withdrawn; and the Bill which was subsequently put forward confined itself to the question of the issue of loan capital. This Bill, after being slightly amended, became law in due course; and the Company has now the power to issue its unraised 3 p.ct. debenture stock, amounting to £750,000, as redeemable debenture stock at such rates of interest as will enable the Company to realize a sum of money equivalent to the nominal amount. Although the capital so raised will be permanent, subsequent issues may be made at lower rates of interest for the purpose of redeeming stock previously issued at a higher rate. Furthermore, should the necessity arise at any time for the floating capital of the Company to be temporarily increased—which, of course, means that the Company for the time being would be in want of cash—the Act gives power for borrowing, by mortgage or debentures, providing that the aggregate amount raised by this means or by the issue of debenture stock under the Act does not exceed the £750,000. You will see, therefore, that the Company has not obtained any further capital powers, but has been given authority to issue its unraised capital in more than one way; and this may prove of very great assistance to the Company in the future. The Company's unissued capital may now be said to be worth its nominal value in cash at any time, which otherwise would certainly not have been the case. You notice from the report that the Directors recommend a dividend of £2 13s. 4d. p.ct. per annum on the 3½ p.ct. maximum stock for the half year ended December last. The maximum stock is one which only slides one way, and that downwards; the holders of this stock being entitled to a dividend of 3½ p.ct. per annum until the price of gas goes above 3s. 11d. per 1000 c.ft. This is, I believe, the first time in the history of this stock that the holders have not received the full dividend; and we can only hope that it will not be long before the maximum dividend is again resumed.

EFFECT OF THE RATIONING ORDER.

Now, with regard to the 7 p.ct. decrease in the Company's business, to which I have referred. This is, of course, a very serious matter for the Company. Some part of the decrease was due to milder weather; but the larger part was owing to the interference in our business by the Gas Rationing Orders. With reference to this, I feel I must say a word or two. The gas industry has much resented the last Gas Rationing Order. We were prepared to make sacrifices for the good of the country and for the conservation of coal; but we did object to the injustice done to gas under the second Rationing Order. In this, 15,000 c.ft. (with a small additional lighting allowance) was fixed as the equivalent for a ton of coal; and very little credit was therefore given for the half-ton of coke which was left over in the production of the gas. Due allowance for this should surely have been made in calculating the gas allowance. The Order has done enormous damage to the industry. It led to many inhabitants of large houses being practically unable to use gas as fuel, and having to use their ration of coal to its fullest extent. There will be a long period of hard work on the part of the outdoor and canvassing staff before this lost business can be recovered. No doubt it will be, because, as a heating agency, gas stands supreme. In view of the fact that the public has been asked during the war to use gas instead of coal, and that, at the behest of the authorities, large sums of money had been spent in the previous year by the public and by the Company in the installation of gas apparatus, it certainly is difficult to understand a policy that practically made its use impossible in many cases. It says much for the popularity of gas that, notwithstanding the drop in the number of consumers, and in face of the restrictions imposed under "D.O.R.A.," there was an increase of nearly 5000 in the number of gas-stoves sold and on hire.

THE COMPANY'S SHIPS—SUCCESSFUL ENCOUNTER WITH SUBMARINES

Since the war began, we have unfortunately lost by enemy action and otherwise twelve steamers, involving the loss of 22 men. Now that there is no longer any need for secrecy, I know that you will be pleased to hear, as a set-off to what I have just told you, that our boats on three occasions had successful encounters with enemy submarines. We had good grounds for assuming that the submarines were severely damaged, if not totally destroyed; and this was confirmed by two of our seaman captains receiving the D.S.C at the hands of His Majesty the King, two gunners being awarded the D.S.M., and substantial grants being made to officers and crews in recognition of services rendered. While we acknowledge our indebtedness to the Ministry of Shipping for their action in controlling rates of freight during the war, it is difficult to see why they should still maintain the same maximum rate, seeing that since the armistice the cost of insurance has come down very materially. I understand freights from North French ports have been reduced by about 5s. per ton in consequence of the lower rates of insurance. It is hoped that the Ministry of Shipping will immediately give this question their serious consideration, as lower freights are a matter of great moment to the gas industry, and would, of course, materially help to cheapen gas. Our fleet now numbers six ships—two of which are absolutely up-to-date colliers, and the others are useful boats which have more than paid for themselves during the last two or three years. One of the Directors' first duties as soon as market conditions settle down, will be to enlarge the Company's fleet of steamers, so as to be more independent of outside tonnage than now.

EMPLOYEES AND THE ARMY.

As you will see from the report, almost 5000 of the Company's men have been serving with the Colours. I regret to say nearly 500 have lost their lives; and I feel sure that you join with us in sincere sympathy with their sorrowing relatives. Our men have done exceedingly well at the Front. Up to the present, as far as we have heard, 74 have obtained Commissions, and 57 have been awarded various distinctions. The Directors think a suitable memorial should in due course be erected to commemorate the men who have so gallantly fought and so nobly died for their country.

THE OUTLOOK.

With regard to the future, it is impossible to prophesy. The present ferment in the labour world has made it impossible to say what the Company may have to pay for raw materials, and, therefore, what may be the maximum price of gas. We had been looking forward confidently, with the prospect before us of a reduction in freights and a promised reduction in the price of future oil supplies, to be able to reduce the price of gas. Unfortunately, since then new factors have arisen which render it impossible to do so at present. The rise in the price of gas is moderate compared with rises in other commodities. The Company before the war was charging 2s. 6d. for its gas—equal to the lowest price on record for the Company. It is now 4s. 4d.—a rise of 73 p.ct., much less than the rise in the price of the raw materials we use. For example, the price of coal, our principal raw material, has gone up 100 p.ct.; gas oil, 500 p.ct.; fire-bricks, 118 p.ct.; timber, 224 p.ct.; lubricating oil, 293 p.ct.; shovels, 233 p.ct.; and paper, 300 p.ct. The public and the shareholders alike, however, may rest assured that no effort will be spared to reduce the price of gas at the earliest possible date. With regard to the future of our bye-products, the situation is somewhat obscure. The manufacture of certain products which were used as war material has, of course, ceased, and we are using the plant for other purposes. To a large extent, the future depends upon what action the Government may take. If the home production of many articles is to continue, the country must not be made a dumping ground for the surplus stock of other nations. Without some form of encouragement, new chemical industries cannot arise, as no company will spend large sums of money on plant unless there is a reasonable prospect of a profit. This is especially the case with public-utility undertakings. Gas undertakings as a whole are quite ready to help in the production of the materials necessary to the dye and other industries for the building-up of a new business in the country. But, being public-utility undertakings, they cannot risk their money without good assurance of success. It is more and more necessary that industry should become more scientific in its methods. We have always employed a certain number of scientific men at our various works; but this is not enough. It is necessary, with the rapid development of science, to keep in touch with scientific bodies whose experts are able to gain knowledge from all sources. An alliance between industrial companies and scientific institutions is needed to keep the interests of companies in touch with the most modern developments in science. For instance, we have recently arranged with one of the leading London hospitals that, while we shall do research work on the production of various substances at our laboratories, the Hospital will study the value of these substances and their effect on bacteria. It is hoped by such co-operation discoveries of real importance to the community, and of commercial value to the Company, may be made. Sulphate of ammonia is under control until the 31st of May next. The present prices average about £17 per ton, which, considering the cost of coal and the cost of the labour in its production, is a very low figure. It is hoped that when the control is removed a considerably higher price will be obtained. With regard to the supply and quality of gas. Since the days of the air raids in the early part of 1918, the Company, I am glad to say, has been able to maintain a full supply of gas, which, considering war conditions, cannot be said to be unsatisfactory. The quality of the gas sent out has averaged 486 B.Th.U. per cubic foot, or only about 7 p.ct. below pre-war standard. This small reduction in calorific power was made with the authority of the Government, who issued an Order in June last enabling the Company to supply gas of 450 B.Th.U. During the whole of the past twelve months, the Government has limited the quantity of gas oil that might be used; and the Coal Controller has cut down the supplies of coal to the Company. We do not complain, as this was in the interest of the nation at large. It should also be remembered that the quality of the coal has been much inferior to that supplied in pre-war days. The question of a satisfactory supply of gas is largely a question of good pressure, together with the suitability of the apparatus in the consumer's premises. The Government has indicated that, owing to the shortage of coal, the companies must continue to exercise the greatest economy in the use of coal. The Fuel Research Board appointed by the Government, under the chairmanship of Sir George Beilby, is carrying on an investigation into the question of the quality of gas to be supplied in the future; and it is believed that the Board will shortly be issuing a report, which, it is hoped, will help to settle this vexed question. There appears to be a tendency on the part of local authorities who do not own gas-works to think that the companies have no regard for the interests of the consumers. Nothing, I may say, is further from the fact. Gas companies are more interested than the local authorities can be, because the success of their business entirely depends upon the goodwill and the satisfaction of the public who buy the gas. This is one of the first rudiments of business. We are in close competition with electricity and coal; and it is impossible for us to supply an article which would compare unfavourably with electricity in efficiency or in price, and, therefore, local authorities and the public may rest assured that it is entirely to a gas company's interest to supply a suitable gas at the lowest possible price.

ELECTRICITY SUPER-STATIONS AND GOVERNMENT SUPPORT.

With regard to electricity. During the war, various Government Committees have reported on the unsatisfactory state of the electricity supply in this country, and have made certain recommendations for

improving it. These proposals include the erection of super-stations, financial support from the Government, and the appointment of a body of electricity commissioners. It is understood that the Government is about to give effect to certain of these proposals by introducing a Bill in the House of Commons. Naturally, the gas industry wishes to raise no objection to the sister industry improving its position; but the situation requires careful watching. Exaggerated claims are being put forward for electricity; and the gas industry is taking steps to lay before the Government the case for gas as the best means of preserving the nation's coal supplies and securing cheap fuel for the public. With regard to the proposed financial support from the Government, we would object strongly if facilities were given to electricity which were not given to the gas industry. We ask no favours, but only fair treatment. A few words on the general question may not be amiss. The uses of gas in manufacturing processes are too numerous to catalogue here; but it may be said generally that there are few finished articles of commerce in the manufacture of which gas does not at some stage play a useful part. Moreover, at the gas-works we preserve for the community all the valuable chemical bye-products—the fuel oils, the motor spirit, the raw material for high explosives, dyes, drugs, disinfectants, and other important articles of commerce, as well as the fertilizers so necessary to agriculture.

THE CLAIMS OF GAS AND ELECTRICITY.

This is not the place to enter into a general discussion of the promised economies of the suggested super-stations for generating electrical energy and delivering it by great lengths of cables through rural as well as urban districts. But there is one thing that needs to be said at once, and which the public would be well advised to note, and to insist should be considered by the authorities, and that is that the use of electricity as a source of heat—for cooking, water heating, house warming, and a great number of industrial processes—is a hopelessly uneconomical way of using our coal supplies. As Prof. Cobb has recently pointed out in the "Edinburgh Review," only some 12 p.ct. of the heat of the coal burnt in the very best electric generating station to-day reaches the consumer in the form of electric energy (not quite 7 p.ct. on the average throughout the country). On the contrary, when coal is carbonized at a gas-works, no less than 70 to 80 p.ct. of the heat is delivered to the consumer in the shape of gas and coke. In other words, there is a wastage of 88 to 93 p.ct. of the heat in the coal in the electric process, and only some 20 to 30 p.ct. lost in gas making. At the electric generating station, moreover, all the chemical bye-products are destroyed. Where light and power are concerned, gas and electricity have their joint and several fields, in some of which one or the other is easily first; while in others they are in close competition and win or lose on local conditions, individual preference, or comparative costs. But where heat is required, the case for gas is overwhelming, alike in cost to the consumer and in economy of coal to the nation.

UNITY IN THE GAS INDUSTRY.

Having regard to the many important questions now facing us, it has been felt that the time has come for greater unity in the gas industry. It has been organized on national lines to a certain extent during the past two years. The organization was, however, not sufficiently representative; and there has now been formed a re-organized National Gas Council, which it is hoped will embrace the whole of the industry, both company and municipal. Its object will be to keep careful watch over the interests of the industry as a whole, and fight its battles, whether great or small. There is every reason to hope that the new body will justify its existence and be able to render good service. Running on parallel lines and organized by the National Gas Council, there is being formed a separate Committee of Employers, who have authority to represent the industry on National and District Industrial Councils, on the lines laid down by the Whitley Committee. It is felt that this is a most important development, as in these times it is very desirable Capital and Labour should work together as closely as possible, not only in individual concerns but also nationally. It is hoped by this means that disputes may be amicably settled and, better still, to a great extent avoided.

CO-PARTNERSHIP.

As reported at the last general meeting, it was proposed to introduce a new basis for our scheme of co-partnership; the idea being that the co-partnership bonus should be calculated at the same rate as the dividend paid on the ordinary stock of the Company. This seemed to the Board to be a rational and proper principle to apply. Certainly it has the advantage at the present time of bringing co-partnership again into active existence. I am pleased to say that the alteration has been received enthusiastically by the whole of our employees; and the scheme is now in full working order. You will see that, under the item of co-partnership in the accounts, there has been an expenditure of £40,000 for the year. Recent events have made it quite clear that the only hope for future peaceful working is that there should be a closer drawing together of employers and employed, whether in the form of Whitley Councils or in the form of works committees, or possibly in a combination of both. The men, at the meetings we have held, have made it quite clear that they welcome being taken into the confidence of the management, and are most anxious to help; and we certainly have hopes that the result of this closer alliance between employers and employed which it is intended shall take place under our revised co-partnership scheme will have beneficial results to the Company in general.

THANKS TO THE STAFF.

I cannot close without expressing the appreciation of the Board of the way in which the much depleted staff has carried out its work during the past twelve months, and, indeed, during the whole period of the war. There have been great difficulties to surmount, owing to the calling to the Colours of so many of our most valued men, and owing to the difficulties of getting others to fill their places. Heads of departments and the officers generally have worked with good will and energy, and the Board is glad to take this opportunity of acknowledging its indebtedness to them. In conclusion, ladies and gentlemen, now the war is over and peace is within sight, we hope that the difficulties at present surrounding us in the industrial world may soon be cleared away, and that this Company will resume a successful and progressive career. [Applause.]

I have now pleasure in moving:

"That this meeting do agree with and confirm the report of the Directors and the Auditors' report and statement of the accounts of the Company as transmitted to the proprietors on the 30th ultimo."

Before putting the resolution, however, I shall be happy to hear any remarks that proprietors may have to make.

The DEPUTY-GOVERNOR (Mr. H. J. Waterlow): I beg to second the resolution.

CONGRATULATIONS.

Mr. BOSHER: As a North Country shareholder, I should like to congratulate you, Sir, most heartily, not only upon the lucidity of your speech, but upon the very delightful way in which you have covered apparently nearly the whole of the gas industry as applied to this Company. I think it is a most enlightening speech; and I am sure we have all very greatly enjoyed it. ["Hear, hear."] I do not wonder now at the Board having elected Mr. Milne Watson to the governorship. At first, when I was coming up from the North to London, I was wondering, Sir, whether you ought to be condoled with, or whether we ought to congratulate you, upon having taken up this important position. I think, perhaps, you need a little of both. Any way I am quite sure it requires a great deal of courage in these terribly difficult days, when changes are occurring with lightning-like rapidity, for any gentleman to take such an important position, with all its onerous responsibilities, as you have done. You deserve our thanks, and personally I think you have them. We hope when we have the pleasure (if we do) of being here twelve months hence, and when you have been a year in office, we may see how well you have done for the Company. You will then, no doubt, have earned our gratitude. I have very great pleasure in congratulating you.

Mr. W. A. HOUNSOM: It is somewhat difficult at all times to say very much at meetings of this great Company; but remembering the years that have elapsed, I think that there is a very different atmosphere now in this room, and therefore it is more easy to do so than it was in the days gone by. I should like, if I may, Sir, to emphatically endorse the remarks that have fallen from you in reference to the late Governor of this Company. It was a splendid exhibition of pluck which led Mr. Miles to step into the breach created by the death of Sir Corbet Woodall; and we owe him a debt of gratitude for having occupied the position, watched over the interests of the Company, watched over the career of the present Governor, and now stepped aside, happy to fill a place at the Board, and still to exercise his paternal care over the Governor and the interests of the Company generally. It is well for us, in speaking of Mr. Miles, to remember the spade work of the late Sir Corbet Woodall, because without his wise, patient, day by day work, the history of the Company during these last few years would have been far different from what it has been. Then, Sir, I also wish to say how fully we endorse the remarks you made in connection with those who have so nobly served their country in the war. We mourn with those who have lost their relatives. We rejoice in the work that has been done. We thank those who have done it, and those who have stepped into the breaches created by their absence, and laboured for the Company; and we hope that when those who are away come back to take up their duties again, the prosperity of the Company will increase, to our mutual advantage. One other thing I should like to say. We are indebted to one of our great scientific leaders for a very illuminating change in one word. We used to speak about the "destructive" distillation of coal; but now we speak of its "constructive" distillation. I should like to place that word alongside another. We are constantly hearing about reconstruction. I hope that reconstruction will be constructive reconstruction, because there are elements at work which are distinctly destructive in connection with the great task we have to perform. While we heartily congratulate the Governor on his position, I think I may say for those on this side of the table that we do look forward with great hope and anticipation to the work he will do in regard to this matter. It is not only in relation to the placing of coal in the retort, but going right away up to the consumer, making of every consumer a friend, and looking after both the lighting and the heating of every home in the great Metropolis in which this Company carries on its operations. Some of us have been watching your career, Sir, inside and outside this Company; and I can assure you of the sympathy of the shareholders generally in the great work you have undertaken as the head of this Board. There is an entirely different atmosphere from what there was twenty years ago in connection with the Company; and the consumers, stockholders, and employees are more and more being brought together in this great industry—which has been so immensely important during the war, and which we hope will be still more important and more serviceable in the great and glorious work of peace.

The report and accounts were unanimously adopted.

THE DIVIDENDS.

The GOVERNOR: I will call upon the Secretary to read the minute of the Court of Directors recommending dividends for the past half year.

The SECRETARY thereupon read from the Directors' minutes the following:

"Resolved that it be recommended to the ordinary general meeting of proprietors, to be held on the 7th prox., that a dividend as follows, for the half year ending on the 31st day of December, be declared, viz.:

On the 4 p.ct. consolidated preference stock at the rate of £4 p.ct. per annum;

On the 3½ p.ct. maximum stock at the rate of £2 13s. 4d. p.ct. per annum;

On the ordinary stock at the rate of £3 p.ct. per annum (subject to the approval of the Board of Trade).

All subject to deduction of income-tax."

Mr. WATERLOW seconded the resolution, which was unanimously agreed to.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The GOVERNOR: The next business is the election of two Directors—Mr. J. Lister Godlee and Mr. Henry Woodall. No words of mine are necessary to say that these are two most valuable colleagues; and I hope they will be unanimously re-elected. I beg to move that Mr. J. Lister Godlee be re-elected a Director of the Company.

Mr. WATERLOW seconded the proposition, which was carried.

Mr. J. LISTER GODLEE: I much appreciate this renewal of your confidence.

The GOVERNOR: I now propose that Mr. Henry Woodall be re-elected a Director of the Company.

Mr. GARRAWAY RICE seconded the motion, and it was agreed to.

Mr. HENRY WOODALL: Thank you very much.

The Auditors (Messrs. John Allen Stoneham and Percy Howard Ashworth) were next re-appointed.

VOTES OF THANKS.

The GOVERNOR: I should like to move a vote of thanks to the staff. I mentioned in my speech the good work they have done; and I now formally propose that a very hearty vote of thanks be given to the staff for their hard work and the energy they have displayed during the past year.

Mr. MILES: I have pleasure in seconding that, because through the whole year I have seen how the staff have worked, and how very well they have done all that they attempted.

The proposition having been heartily agreed to,

Mr. THOMAS GOULDEN (Chief Engineer) said: Let me thank you very heartily on behalf of the staff and of the workmen of the Company for the vote which has been proposed and unanimously adopted by you. It will be a great encouragement to them to know that you appreciate their efforts, which certainly have been very considerable, to produce the greatest quantity of gas at the cheapest possible rate during the past year. We have had vast difficulties during the war, and at no time have they been greater than during the past year. But with the combined efforts of the staff (who have had a very trying time) and of the workmen (who have done their best with regard to the work), the result has been as shown to-day. It may seem a little bit strange to you that, while the cost of materials and labour has gone up so much during the past year, the price of gas has not had to be correspondingly increased. But among other conditions, there has been some small relaxation of statutory regulations with regard to calorific value; and that is what has enabled us to effect this result. As the Governor indicated, there has been a drop of 7 p.ct. in the gas made; and co-incidentally there has been a drop in the calorific value of 7 p.ct. also—a difference in calorific value so small that in its effect it would be exceeded by the turning of a tap too much or too little. In fact, I am convinced that no consumer has been in any way detrimentally affected; but its effect upon the Company has been enormous. Although the consumption of gas has been 7 p.ct. less, the consumption of coal has been 11·4 p.ct. less, and the consumption of oil no less than 37 p.ct. less. The accounts must have borne a very different complexion from what they do, if it had not been for this; and the consumers would have had to pay a much higher price for their gas. Moreover, beyond the saving effected by the Company and the consumers, the country has very much gained by the economy in coal. The workmen have stood very well by the Company. We have had very little trouble from unofficial strikes, and have been able to keep up the supply of gas. On no single occasion, from any cause, have we had to reduce the pressure. It will help the workmen to know that you appreciate their endeavours; and they will, I am sure, continue to do their best.

Mr. F. G. PILLEY: I have a pleasant duty to perform, which to-day is a greater pleasure than has sometimes been the case. Unfortunately, during the last few years the motion I have to propose—a vote of thanks to the Governor and Board for their services—has been tinged on several occasions with considerable regret, owing to losses that the Company had sustained. This time, fortunately, I think that there need be no expression of regret at all. Mr. Miles has retired from the Governorship; and he was entitled, with advancing years, and considering his great services in the past, to get this measure of relief. He has been succeeded by a gentleman much younger in years; and these are days of younger men. The Company has had most difficult times to get through; and we want you to look at this vote from two points of view. First, in regard to the difficulties of the past year; and, secondly, as a vote of confidence in the Board for the coming twelve months. We have been told that we have won the war. That, of course, is quite true; but we have yet to reap the benefits. At best, there are the very gravest difficulties before us. The affairs of the Company will require the most careful and constant attention. They will have to be carried through during a time when very prompt decisions will have to be arrived at, and very firm handling will be needed. We can assure the Board that they have our absolute confidence.

Mr. BOSHER: I shall have much pleasure in seconding the vote. I am a Director of one or two companies; and I sometimes think that Directors are not sufficiently appreciated. [Laughter.] Let us hope that we shall properly appreciate our Directors.

The resolution was heartily carried.

The GOVERNOR: We are much indebted to you for your kind vote of confidence. Let us hope we shall merit it during the coming year.

Curious Compensation Case.—At Bury County Court, on Monday of last week, a claim was made under the Workmen's Compensation Act by the widow of James Hardman, formerly a lamplighter in the employ of the Radcliffe Urban District Council. Hardman, it was stated, on the night of Oct. 22 last, took a short cut across a field from one part of his round to another and falling into a pond was drowned. For the Council, it was argued that Hardman's duties definitely laid down that he ought to go along the main roads. The Judge, however, held that the widow was entitled to compensation, and awarded her £170 3s. 6d.

BRENTFORD GAS COMPANY.

The Annual General Meeting of the Company was held last Wednesday, at the Caxton Hall, Westminster, S.W.—Mr. R. J. NEVILLE NEVILLE in the chair.

The SECRETARY (Mr. John T. Croxford) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

SUPER-DIFFICULTIES AND A GOOD BASIS OF STABILITY.

The CHAIRMAN said it was his duty to the proprietors to move that the report be adopted. As they knew, this had been a very critical and difficult year for all industries, and not least for the gas industry. It had been faced with many restrictions, and with great difficulty in getting supplies at increasing prices, and also, of course, with a rising scale of wages. Everything, the Company had had to buy—such as coal and oil—had been more or less controlled against them; and everything they wanted in the shape of materials had gone up proportionately. As to what they had to sell, as the proprietors knew, under the sliding-scale (which was invented and put into force some forty odd years ago), they had to pay practically for the increases which they could not in any way get rid of or obviate—such as increases in the price of coal and wages. The proprietors were, in fact, carrying for the benefit of the community, at their own expense, a very large portion of the cost which, in other circumstances, in other industries, were passed on to the consumers or the general public. For instance, in the case of the railway companies, the taxpayer (this was a vicious system) had to make up the deficiencies of the companies who were unable to pay the wages bill out of their earnings. He hoped this would not take place in the gas industry. It would be a lamentable thing if the taxpayers were to be called upon to make up the deficiencies of uneconomic working; for this was the position that all industries such as public utilities were likely to be faced with. The result of these difficulties was seen in their accounts that day. Although this was perhaps the most unfavourable account he had had anything to do with since he had been a Director of the Company (now some twenty-five years), he thought they might, on the whole, congratulate themselves that they had come so well through the position. But this was due to the fact that the Company had a basis of stability which, with all the difficulties through which they had passed during the war, had enabled them to stand the shock of change, and of increased prices, better perhaps than any other company in the Metropolitan area.

THE SLIDING-SCALE AND CAPITAL RAISING.

As the proprietors were aware, the gas companies felt so strongly last year that they were being badly treated by the insistence of the sliding-scale arrangements, that they applied to Parliament for some assistance; and Parliament dealt with the application (as he thought most gas proprietors would consider) in an extremely niggardly and petty way. As a matter of fact, he himself had always believed that, as "Dora" could do almost anything she liked, the relief might have been given without any appeal to Parliament, if certain people had so wished. But those in authority feared, as they often had feared, what might be said about it; and so brought the matter before the House of Commons. As the proprietors knew, many people liked to have a shy at the gas companies when anything concerning them was before Parliament. The result was that an Act was passed which allowed three-quarters of the standard dividends. This Company were not reduced to three-quarters of their standard dividends as were some of the other companies. The sliding-scale, however, affected them in every possible way. It affected them in regard to the capital they had to raise; and this would be appreciated by the fact that they were unable to raise capital at the present time under 6 p.ct. by mortgage bonds. It would be seen by the accounts, and this showed the confidence of the proprietors, that they had during the year raised fresh capital, in 6 p.ct. mortgage bonds, to the extent of £111,950. But, of course, the more money that was raised on mortgages or fixed-interest bearing securities, the less proportion of capital there would be under the sliding-scale. When the Company's Bill was before Parliament last summer, the suggestion was made that they should extend the proportion of their debenture issue to the ordinary capital. The result of this, of course, was to withdraw more and more of their capital from the sliding-scale. So Parliament itself had seen that the sliding-scale from the point of view of raising capital was of no use at the present time; and it might be a long time before it was of any use. This was practically the position.

THE SITUATION ILLUSTRATED.

He did not think it was necessary for him to go through the accounts, except to point out how inflated they were. For instance, the stocks of coal and oil, compared with 1914, were now valued at £166,000; and they were in 1914 at £55,268. Therefore, the value had risen practically 200 p.ct. But, instead of having more coal on the works than before, they had 40 p.ct. less; showing that in this one expense alone (which was a very important expense for the Company), although they had this enormous figure for their stock, they had less stock on the premises now than they had in 1914. This was a typical instance of the position in which they were now placed. Again, comparing this year with 1915, the sliding-scale dividend was then, as would be remembered, the full dividend. For two years the Company bore the whole brunt of the circumstances of the war without turning a hair. Owing to the good management of the Engineer (Mr. A. A. Johnston) and the staff, for two years they bore this without interfering in any degree with the manufacture or rate of dividend. This was altered when they came under the Coal Controller, and he switched off their ordinary supplies of coal. They had then to eat into their stocks, and were made to buy in the open market, so cancelling their foresight in this matter. Of course, the price they had to pay went up; and, as compared with 1915, the sliding-scale dividend had decreased 36 p.ct., while the turnover had increased 64 p.ct., and the output of gas had increased by 10 p.ct. These figures were a sort of index, showing how difficult it had been to finance the Company during these years, to arrange for their future, and for the proper carrying on of the business.

MORE CAPITAL AND WORKS EXTENSIONS.

Of course, they would require, and should require soon, more capital. As he had told the proprietors at the last two or three meetings, they were very nearly at the end of their tether with regard to the plant—partly owing to the trouble they had last year with their Bill in Parliament, under which they proposed a new site for works at Chiswick. This was denied them on sentimental grounds. But he believed it would be found that, though this site was not dedicated to their use, it would be to some other industrial concern. However, through this they had been compelled to take up the question of the extension of the existing plant. Until the past year they had had increases in the gas consumption; but last year there was a decrease of 7·08 p.ct. In a sense, this decrease had been a blessing in disguise, because, if increases had continued as they had been doing, their plant would have been strained to bursting-point, which would have increased the cost per 1000 c.ft. of all their operations. So they would eventually have to raise new capital, and to go in for further extensions. But if they could avoid in any way spending capital at the present time, they would do so. The circumstances were very uncertain—labour was uncertain, and the prices of materials were abnormally high. They would, therefore, be well advised not to spend, and the Directors would not spend, any capital, if they could help it, at the present time. What they would do now was to systematically reconsider the whole of their manufacture, and see whether they could prolong the life of their plant by any new arrangement. They might possibly change the method of manufacturing gas, and so make the best of what they had, until the clouds rolled by, and they got into a more sunny climate.

RELATION OF WAGES TO THE GAS BUSINESS.

He should like to tell the proprietors of the position as it related to wages. The real state of the accounts was due to the wage value. This was the chief factor which made the accounts appear in the form in which they were now. They had gone carefully into the question of wages; and he thought it would be of interest if he told the proprietors what proportion the amount spent in wages bore to the total. The total wages paid on their turnover (which last year was £971,669) was to-day about £615,000—not to their own men entirely, but to the various wage earners who were employed in producing the various raw and other materials which were used in the course of their business. This sum amounted to 3s. 3d. per 1000 c.ft. In their own case at the present time, they were selling gas at 4s. per 1000 c.ft. Therefore, there was only 9d. left (omitting the income from residuals) in the price of 4s. to cover other expenditure, as well as dividend and interest. This was a very large proportion; and it could be put in another way. It meant that 81 p.ct. of the amount that was paid by the consumers (or 9¾d. out of every 1s.) went in wages to the various people employed by the Company or indirectly in producing the raw and other material they used. Another matter, which showed the effect of wages upon the accounts was this. The output of gas per £1 spent in wages in 1913—that was, the year before the war—was 28,000 c.ft. In 1918 it was 15,000 c.ft. for every £1 spent in wages; thus showing a difference of 13,000 c.ft. Or, in other words, there was a decrease of 46 p.ct. in output for each £1 paid in wages. To put it in another form, so as to bring the point out clearly, if the output per £1 of wages had been as in 1913, they would have produced and sold 6,727,000,000 c.ft. of gas last year. As a matter of fact, they sold 4,102,000,000 c.ft. last year; and if their output per £1 of wages had been the same as in 1913, they would have sold 2,625,000,000 c.ft. more. It was right these things should be shown, because consumers did not understand why it was necessary for the price of gas to be raised. When they realized that out of every 1s. paid for gas, 9¾d. went in wages, they would be surprised at the Directors' moderation in not putting the price of gas at a higher figure than 4s. These were the salient factors of the year; and the proprietors might take it from him that the increase of every one of the items in the accounts that had advanced had been due to the great inflation in the cost of wages.

THE WAR RECORD.

With regard to the war, might he just mention the contribution of men that the Company had made? Of their 1500 men, some 53 p.ct. joined-up, which was a very honourable and creditable matter to their Company. Of those who joined, 350 had been wounded, or nearly 50 p.ct. Some 98 had been killed, or 14 p.ct. This was a larger percentage than the average percentage according to the published returns of the British casualties. He believed the killed in the casualties returns did not amount to more than 10 p.ct.; but the Company had lost 14 p.ct. They had had many honours distributed among their men. No less than 31 of the men had received His Majesty's commission as officers; and the Company were grateful to them for their services. Fifteen of the men had been decorated, or given special honours. So far as man power was concerned, the Company had been manfully represented.

THE IMMEDIATE OUTLOOK NEBULOUS.

With regard to the future, of course no man could predict; and he was not going to say anything at all about what sort of position the Company would be in this time next year. They had at present to deal with great difficulties with regard to labour. Labour was in a state of unrest; and until they could get to some sort of settled conditions, it was impossible to estimate what position they would be in. The policy of the Directors was the same as it had always been—to cheapen the price of gas as soon as they could, to get as much as they could out of the plant, to spend money as economically as they could, and to reduce working expenses as much as possible. They hoped to do this to some extent this year.

A LITTLE IMPROVEMENT OF THE BRENTFORD SITE.

The Company had been buying a little land which was wanted very badly in the neighbourhood of the Brentford works, and which had enabled them to store coal; and this had stood them in good stead indeed. It had been the policy of the Board to make extensions of the land at Brentford as opportunity offered, for their quarters there were very confined. It was really not a place where they ought to be operating, for the works were situated on a comparatively little strip of land. Still it was their business to try to make the site better whenever possible, and so get greater advantage out of it. It was economical from the point of view of river frontage.

A TEMPORARY REDUCTION OF CONSUMPTION AND HOUSING PROSPECTS.

The proprietors might like to know the cause of the decrease in the sale of gas. It was, of course, largely due to fuel and lighting rationing. Every consumer was rationed last year; and this had had a material effect upon the output. Another reason for the decrease was that in their district they had been fortunate during the war in having a large number of munition factories, which had been consuming considerable quantities of gas; but soon after the armistice, many of these factories closed down. During the last two months, therefore, they had been getting a big decrease; and this accounted for a large portion of the decrease shown for the whole year. He was glad to say that now they had almost turned the corner. Comparing the past year with the previous one, when they had an enormous increase in the requirements of the munition factories, it was a credit to the Company that the deficit was not greater than it was. This indicated that they were getting back to their normal consumption, which was a fortunate thing, and a point upon which the proprietors might congratulate themselves, because it showed the great stability of the business and district. After the war, their area was ripe for a large amount of housing. He supposed there was no gas company's district, certainly in the neighbourhood of London, which was so likely to benefit from increased housing arrangements as theirs. The Company had 100 square miles of territory; and of it they had not more than about 15 to 20 square miles filled up. But a great part of the land was ready for building. The future of the Company would depend upon getting cheap capital, spent economically, and upon receiving advantage from an increasing population and accommodation, which the district must afford to many industries and people who wanted to live in an industrial neighbourhood. The Company had altered a great part of their methods during the war. They had put up plant for producing various constituents of gas required by the War Office. They would now do their best to utilize this plant for the benefit of the Company; and he thought they would be able to do so.

Sir ROBERT SHAFTO ADAIR, Bart., seconded the motion, which was carried unanimously.

THE DIVIDENDS.

Proposed by the CHAIRMAN and seconded by Sir R. SHAFTO ADAIR, the statutory dividends, subject to income-tax, were declared—viz., at the rate of 5 p.ct. per annum on the 5 p.ct. preference stock, at the rate of £3 14s. p.ct. per annum on the "A" consolidated stock, and at the rate of £3 2s. 6d. p.ct. per annum on the "B" consolidated stock.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The CHAIRMAN proposed the re-election as Directors of Mr. D. Milne Watson and Mr. William Mann. He remarked that the proprietors might be immensely congratulated upon the fact that they had Mr. Milne Watson as one of their Directors at the present time. He was the mainspring of the gas industry, which was going through a very difficult period. He was the one man in England who probably knew more about the situation and the difficulties of the gas industry than anybody else. It was of the greatest advantage to have his knowledge and ability at their service. With regard to Mr. Mann, nobody knew more about the Company than he—in fact, he was almost born and bred in the Company, and had been familiar with every item, and its history and fate over a great number of years.

Sir R. SHAFTO ADAIR seconded the motion, which was cordially passed.

Both Mr. MILNE WATSON and Mr. MANN thanked the proprietors for their continued confidence.

Moved by Mr. W. B. FARQUHAR, and seconded by Mr. W. J. GREW, the retiring Auditors (Messrs. Monier F. Monier-Williams and Alfred Bevis) were re-appointed.

A VOTE OF THANKS.

The CHAIRMAN said the Directors were most grateful to their chief officials and staff for the efficient manner in which they had carried on the work of the Company in very trying circumstances.

Mr. GREW proposed a vote of thanks to the Chairman and Directors, the Engineer and Secretary, and the whole staff.

Mr. FARQUHAR seconded the motion, which was heartily passed.

The CHAIRMAN said all included in the vote were much obliged for this renewed expression of confidence. The proprietors might rest assured that they were anxious to do all they possibly could, so that this splendid business might be carried on in the future as in the past. They might trust their Engineer and the staff, as well as the Directors, for having the best interests of the Company at heart.

Shanklin Gas Company.—There is a balance to the credit of the profit and loss account for the year ended Dec. 31 of £1983; and the Directors recommend a dividend for the twelve months at the rate of 3½ p.ct. less income-tax. The high price of coal and freights, and all other materials and labour, and the difficulty of obtaining supplies continue to cause much anxiety to the management, and necessitated an increase in the price of gas last July to 5s. 10d. per 1000 c.ft. There was more gas sold than in the preceding year.

An Eleven Per Cent. Increase at Scarborough.—An increase of 31 million c.ft., or 11 p.ct., over the previous twelve months, is announced by the Directors of the Scarborough Gas Company in their report for the year to December last. After providing for interest charges and preference dividend, the Board recommend the payment of the usual dividends for the year on the ordinary stocks, at the rate of 5 p.ct. per annum. This will leave a balance on profit and loss account of £2809 to carry forward. In consequence of increased costs, it was decided to raise the price of gas 4d. per 1000 c.ft. from the June meter readings, and to reduce the discount allowed for prompt payment from 7½ to 2½ p.ct. from the September quarter. Also, owing to the increase in the cost of repairs and renewals of meters, rents were advanced 50 p.ct.

BOURNEMOUTH GAS AND WATER COMPANY.

The Bill in Parliament.

The Wharncliffe Meeting of this Company was held at the London offices, No. 90, Cannon Street, last Friday.

Mr. WILLIAM CASH, the Chairman of the Company, who presided, expressed his regret at having to call the shareholders together specially to sanction the Bill which they had deposited in Parliament for the current session, seeing that the annual meeting would be held in a fortnight's time. It was necessary to do so, however, as if the Wharncliffe meeting were left till then it might be out of time. In moving the approval of the Bill, he said that it was proposed to erect additional gas-works, with a period of four years for their completion. Compulsory powers were also sought to take more land adjoining the existing site. The additional land was not of very great value—being mud land; and a period of three years was asked in which to acquire it. Powers were taken to purchase land by agreement to the extent of 5 acres, and further powers for more land if it was required for a housing scheme in connection with their workpeople. Then it was asked that the restriction placed upon the Company in 1903, preventing the erection of a retort-house on the existing site, should be removed. In connection with their capital, powers were taken to convert the original £10 shares, which had received substantial dividends, into two £5 shares. This would have no effect upon the relative rights of this capital or any other capital. Instead of a standard dividend of 10 p.ct., it would be 5 p.ct., and the slide would be 2s. 6d. p.ct., instead of 5s. p.ct. Thus the position of the shareholders would be exactly the same. Additional capital powers were asked for to the extent of £600,000, and permission was wanted to raise some portion of it as sliding-scale capital. But before fixing the proportion, they thought they would like to know the views of the local authorities. It was further asked that part of the preference capital should be redeemable; and the Bill contained the usual Treasury clause as to raising capital. Another matter dealt with was the anomaly that the slide worked annually—any increase of price in any part of the year affecting the dividend for the whole of the year. It had been the practice of Parliament to make these slides half-yearly; and this was included in the Bill. Other powers were to make the shareholders' meetings yearly instead of half-yearly, the issue of certain debentures by auction or tender when they were issued for profit-sharing purposes, and various administrative provisions.

Sir CHARLES JESSEL seconded the motion, which was carried without discussion.

Consumption of Gas at Halifax.—At the last meeting of the Halifax Borough Council, the Gas Committee reported that during 1918 the gas sent out totalled 570,653,000 c.ft. As compared with 1914's total of 620,739,000 c.ft., this showed a decrease of 8·06 p.ct.

NEWPORT (MON.) GAS COMPANY.

It was pointed out by the Deputy-Chairman (Mr. George Geen), who presided at the half-yearly meeting of the Newport (Mon.) Gas Company on Monday of last week, that the accounts revealed an increase of 11,173,000 c.ft. in the sale of gas, or 5·12 p.ct. over the corresponding period of the previous year. Expenditure had been much greater; but the net result of the half-year's working left £7179 as the balance to be carried to the profit and loss account. As it took £8609 to pay the debenture interest and the dividend of 2½ p.ct. for the half year, the Board felt justified in anticipating the sanction of the proprietors to the transfer from the reserve fund of £1400 for this purpose. The present price of gas was 4s. per 1000 c.ft., which was an advance of only 37 p.ct. on pre-war rates. Gas undertakings generally had a right to look to the new Parliament for some amelioration of their difficult position. Unless a reasonable return in the shape of dividends could be secured, the raising of the necessary money for extensions and improvements would be impossible, except on such terms as would be a permanent burden upon the large body of gas consumers. It had been the constant endeavour of the directors to keep the Company well abreast of the times; and he would like to express their appreciation to the Secretary (Mr. T. H. Hazell), Engineer (Mr. Thomas Canning), and Manager (Mr. J. H. Canning), together with their staffs, for the unstinted devotion and energy exercised in overcoming a vast number of difficulties arising in present circumstances in the carrying on of the business of the Company. The conditions now were that the price of gas, 4s. per 1000 c.ft., to the ordinary consumers was the maximum permitted under their parliamentary powers. In 1914, the cost of coal and oil was only £30,778; whereas in 1918 these materials cost £50,849, an increase of £20,071, which was 63 p.ct.,; while the advanced price was only 37 p.ct. The wages bill in 1914 amounted to £18,978; in 1918, it was £35,802, an increase of £16,824, or a rate of 88 p.ct. Wages and coal together cost £36,895 more than in 1914. This, upon the present make of gas, was equivalent to 1s. 6·6d. per 1000 c.ft. In addition, the cost of all other materials had increased very considerably. In spite of the present unfavourable circumstances, and the great difficulties which the war had imposed, he thought the outlook for the future was distinctly encouraging. The gas industry could look forward confidently provided that it received fair play, and was granted the same freedom as its competitors. The report was adopted; and the Directors and staff were thanked for their very efficient services.

Gosberton Gas-Works to Close.—In consequence of difficulties with regard to coal and labour, together with increased prices, the Gosberton (Lincolnshire) Gas-Works are to close. Mr. C. H. Holland, the owner, is dismantling the works, and proposes to sell by auction the whole of the plant and accessories.

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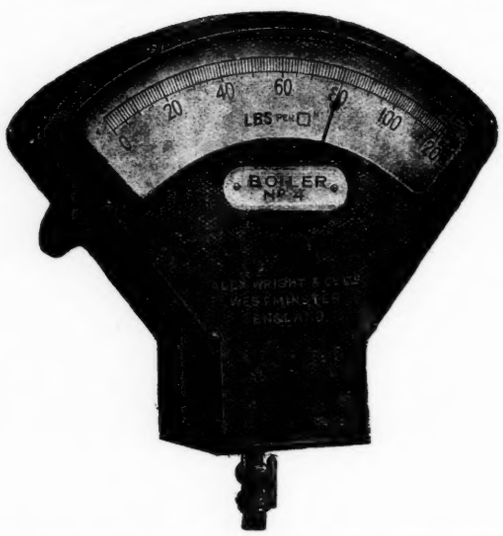

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NOTTINGHAM GAS SUPPLY.

Adopting the unusual course of himself seconding a resolution which, by implication, cast a reflection upon the Gas Committee of which he is Chairman, Alderman Albert Ball, at the last meeting of the Nottingham Corporation, availed himself of the opportunity to present in their true light some difficulties of a situation which even locally appears to be but inadequately understood.

There has not unnaturally been a great deal of impatient feeling in Nottingham, as elsewhere, at the delay in returning to pre-war conditions; and, in regard to the continued paucity of street lighting, this found expression in a proposal brought forward by Mr. Bowles, one of the labour members, expressing the opinion that the time had arrived when a great improvement should be effected in respect to the illumination of the public thoroughfares—the Council being invited to direct the Gas Committee to see that a change was at once brought about. He based his appeal mainly upon the score of the inconvenience and sometimes the danger involved to workers proceeding in the early morning to their occupations at the factories or elsewhere; while upon the general question of the policy of the Committee, he urged that there was no justice in the process under which working people in Nottingham were called upon to pay an extravagantly high price for gas, in order that the general district rate might be kept down by utilizing profits derived from the undertaking.

Alderman Ball, while declaring his desire to be as keen as that of the mover of the resolution for effecting an improvement in the lighting of the city, pointed out some very formidable obstacles which lay in the path of the Committee. The abnormal conditions which still prevailed must be remembered; and in this connection he utilized the occasion to say something in answer to recent newspaper criticism as to the poor quality of gas supplied in Nottingham. There seemed to be an idea entertained, he said, in some quarters that an inquiry should be held in relation to the matter. If it would do any good, by all means let an inquiry be held; but none could result in the provision of a higher quality of coal, which was the indispensable element for the making of better gas. The coal trouble was at the root of the whole matter. The condition had become so serious in Nottingham that at present they had only a ten days' supply of coal in stock; and the outlook would be grave indeed if there was any further development of labour unrest, entailing more restriction of supplies. Some 75 p.ct. of the complaints which had been forthcoming as to Nottingham gas were really due to the inadequate size of pipes and fittings on consumers' premises. He hoped, therefore, that, whenever the Corporation had a Bill before Parliament, powers would be obtained to deal with this difficulty, and that thereby the Gas Committee would be placed in an analagous position to the Water Committee, who could insist upon certain sized pipes being used. In the interest of the general body of consumers, new regulations in regard to improved appliances should be enforced at the earliest possible moment. It was impossible to supply the city with gas of 16 candles, even if they had the coal, for less than 4s. 6d. or 5s. per 1000 c.ft. In pre-war times, the average price of coal bought by the Committee was 10s. 5d. per ton; but to-day the price was 25s., and the Committee had to go as far afield as Durham or the Leeds district for much of their supply. The coal which was now being received was not anything like up to the former standard; and, acting upon the instructions of the Coal Controller, they had been making a large proportion of carburetted water gas.

The resolution was adopted; Alderman Ball expressing the fear that, unless the cost of coal and labour decreased, the price of gas to all consumers would have to be increased.

SELECT COMMITTEE ON TRANSPORT.

The Final Witnesses.

Taking up, from the point reached last week [*ante*, p. 226], the remainder of the evidence given before the Select Committee on Transport, it may be said that there were only five witnesses after Mr A. W. Gattie, whose views have been already summarized. The Committee, it will be remembered, were appointed for the purpose of considering what steps, if any, it is desirable to take to develop and improve the internal facilities for transport within the United Kingdom, to secure effective supervision and co-ordination, and to ensure that such developments and improvements shall be adequate and suitable to meet the national requirements.

Sir Evan Jones, Bart., the Chairman of the Road Transport Board, and at that time also Petrol Controller, said the Board was constituted purely to deal with a special question, which was entirely governed by war conditions. At one time the stocks of petrol in the country were down as low as three weeks' supply for the civilian population. This was at the beginning of last year; and it was what led to the formation of the Board. It was an inter-departmental body attached to the Board of Trade. Witness went fully into the work accomplished by the Board, and then dealt with the possibility of the development of road transport after the war. In solving the problems which presented themselves, it was found that there was a new field of utility open to the road motor service. He gathered the opinion that there is a very considerable field where road transport may be profitably developed—not in the sense of private profit, but in its general meaning. Particularly would this be the case with regard to the development of backward areas. Road transport will, however, never become successful and develop materially with the costly type of vehicle on the road to-day. It must be something which can be so cheaply obtained that its maintenance is a secondary consideration. To his mind, the elimi-

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nation of handling is undoubtedly the secret of success in the movement of goods in the future. There is also a field for light railways, running alongside the roads.

The next witness was Mr. Garnham Roper, C.B., the Assistant Secretary of the Board of Trade, who is in charge of the Department which deals with harbours. He explained the Board's powers under the governing Acts. The great reduction in the tonnage at all United Kingdom ports and the increased cost for wages and materials have had a serious effect upon the finances of Harbour and Dock Authorities; and in response to appeals to the Board of Trade for help, the Board obtained powers under the Defence of the Realm Acts to make Orders increasing the statutory charging powers in cases where they considered it was necessary for the successful prosecution of the war that an undertaking should be carried on in an efficient manner, and that, owing to circumstances arising out of the war, this could not be done without charging rates in excess of those authorized. The Board have made about sixty Orders under this Regulation, authorizing rates varying from 35 to 100 p.ct. in excess of statutory charges. They recommended to the Select Committee on Emergency Legislation the continuance of this power for at least three years after the end of the war, to cover the period of recovery. Asked whether there were any directions in which the powers of the Board of Trade could with advantage be extended so as to get better national supervision of harbours, and also national initiative for the improvement of harbours, witness said his own view was that much more could be done; but it would be necessary to be careful how it was done.

Sir Woodman Burbidge, Bart., the Managing-Director of Harrod's Stores, spoke of his wide experience in connection with the collection and delivery of goods, and said he was very much in favour of the Gattie clearing-house system, as far as concerned railway goods. He thought it would be practicable to scrap all the goods stations, and get them together under Mr. Gattie's scheme. Mr. Francis T. Graves, a representative of Messrs. Cook, Son, & Co., said that, so far as he had been able to judge from seeing the Gattie apparatus and the machinery, he thought, if adopted, it would be an improvement on the present system. He had, however, not looked at the matter from the point of view of a huge clearing-house. Mr. Lionel A. Martin, a partner in the firm of Messrs. Henry Tate and Sons, was deputed by the London Chamber of Commerce to give evidence on their behalf on the question of the unification of control of railways as affecting commerce during the war, and on the advisability of continuing such unification in normal times of peace. Their experience of Government control in the last three years, he declared, had not made them more favourable than they were before to this control. The railways should be managed by the railway people themselves, who knew their own business; and traders should have safeguards, and also power of redress if anything was wrong. A voluntary Arbitration Court might be set up for the settlement of traders' cases. Canal traffic should be encouraged as far as possible.

This brought to a close the evidence taken by the Committee.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 10.

Pitch still continues in good demand; the price remaining firm at not below 65s. per ton net in bulk at makers' works. There is plenty of inquiry for creosote; the price being called at 6d. to 6½d. per gallon. In tar spirits, solvent naphtha is somewhat quiet at 3s. to 3s. 3d. per gallon; but, on the other hand, benzol is in good request for motor purposes. The latter article can now be purchased free of all restrictions as to licence.

The position as regards sulphate of ammonia remains unchanged.

Tar Products in the Provinces.

Feb. 10.

The average values for gas-works products during the week were: Gas-works coal tar, 30s. 9d. to 35s. 9d. Pitch, East Coast, 45s. to 47s. 6d. per ton; West Coast—Manchester 37s. 6d. to 40s., Liverpool 37s. 6d. to 40s., Clyde 37s. 6d. to 40s. nominal. Benzol 90 p.ct., North, 1s. 10d. to 1s. 11d.; 50-90 p.ct., naked, North, 1s. 10d. to 1s. 11d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. 6d. to 2s. 7d. Heavy naphtha, North, 2s. 10d. to 2s. 11d. Creosote, in bulk, North, 4¼d. to 4½d. Heavy oils, in bulk, North, 5½d. Carbolic acid, 60 p.ct., about 1s. 6d. Naphthalene, £25; salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.ct.; "B" quality, 1½d. to 2d.

Letters have been received protesting against a price for carbolic acid being included in the "JOURNAL" during the month of January. Last week one correspondent again returned a price of carbolic acid as 3s. 6d., and the value of crystals at 1s. 1d. a lb. whereas crude carbolic acid was, we understand, absolutely unsaleable—not even an offer of 1s. 2d. a gallon for it could be obtained; while crystals are nominally 6d., and even at this figure there are no buyers. Naturally, one correspondent says, the tar producer cannot understand it when the tar distiller protests against the inclusion of carbolic in valuing his tar. Up to the end of December, the crystals manufacturers had agreed to pay the tar distillers 3s. 6d. per gallon for carbolic; and when this agreement was made (which was in September last), it was intended to agree a price on the 1st of January for January-March, and a price on the 1st of April for April-June. It was not, however, until the 29th of January that the tar distillers and the crystals makers finally decided that it was an impossibility to agree a value for crude carbolic during the month of January. Therefore no sales at all of carbolic were made pending the agreement of a price; and to-day the position is that the article is absolutely unsaleable.

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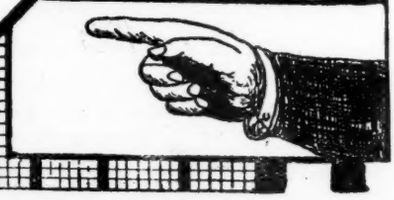

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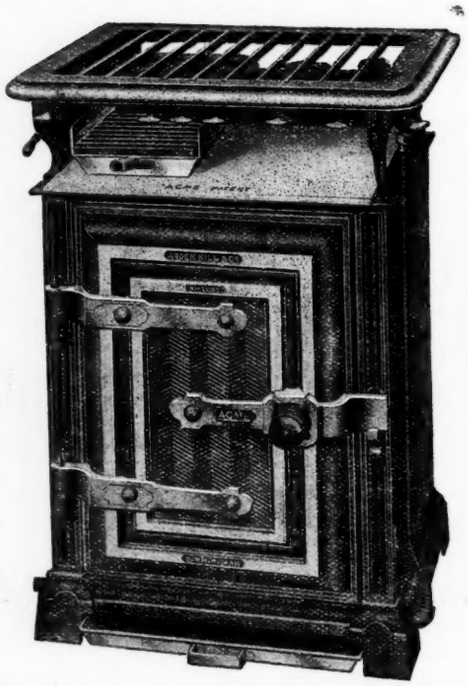

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FROM A MARKET CORRESPONDENT.

Tar Products.

The loss in the production of coal, owing to strikes in various districts, has had a marked effect on the outputs of bye-products; and, generally speaking, production is smaller now than at any time since August last. Prices of tar products are in consequence well maintained, although there is very little alteration from last quoted rates. Prepared tars are in good request, and fairly remunerative prices are available. Pitch remains steady; London manufacturers being pretty well sold forward. In the Provinces, prices remain without change; but, judging by recent engagements, tonnage is becoming more plentiful, and a resumption of the upward movement in quotations is probably only a matter of time. Toluol is rather firmer on better buying by the dye interests; while benzol is selling more freely—petrol interests having come into the market of late. It was rumoured that these distributing agencies would be called upon to pay the tax; but probably this relates to mixtures only. It is officially announced that no licence is now required for the purchase of benzol; and this concession should lead to a material increase in business. Business in carbolics is distinctly dull, and prices have fallen sharply. Cresylic acid is just firm. Naphthas remain on the heavy side; but anthracene is dearer. Other products are without change.

The range of quotations is as follows:

Benzol: 90% London, 2s. per gallon; 50-90%, 2s. per gallon.
Carbolic Acid: Crude 60's 2s. 6d. to 2s. 9d. per gallon; crystals 40% 1s. 1d. per lb.; pale liquid 98-99 p.ct., 3s. 8d. per gallon.
Crude Tar: London 40s. to 41s.; Midlands 34s. to 36s.; North 35s. per ton *ex* works.
Pitch: London, 67s. 6d. to 70s. per ton; East Coast, 47s. 6d. to 50s. per ton; West Coast 43s. to 44s., with Manchester 40s. per ton and Glasgow 47s. 6d. per ton; South Wales, 48s. per ton.
Solvent Naphtha: London 2s. 9d. to 3s. Provinces average 2s. 8d. per gallon.
Crude Naphtha: Naked 1s. 1d. per gallon.
Heavy Naphtha: 2s. 9d. per gallon.
Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.
Toluol: Naked, 3s. 1d. to 3s. 3d. per gallon nominal.
Creosote: London 5½d.; North 4¾d. (Government price, 75s. per ton f.o.b.—equal to 4⅛d. per gallon); heavy oil, 6d. per gallon in bulk.
Anthracene: 40-45%, 4½d. to 8d. per unit per cwt.
Cresylic Acid: London, 3s. 3d.; Provinces, 3s. per gallon.
Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

Home trade pursues a normal course, and there is a good inquiry for export, although business in this direction is of very small dimensions, and without signs of improvement until restrictions are removed or modified. The nearest value for export is about £32 per ton; but the trade is by no means agreed as to future prospects. Exports are forbidden for the present—the current Order terminating on May 31. The trade is hoping, however, that the position will then become clearer, with export permitted at least to a limited extent. Last year the Association's programme included a selling organization; the idea being to develop and maintain the home market. The position regarding exports was not so explicit; but surely the importance of the foreign and colonial trade is sufficient to warrant a little more attention. Syndicated action, as I mentioned last week, is contemplated in the North, where the manufacturers are securing the assistance of the regular merchants. From America comes the news that there is very little doing in sulphate of ammonia, and manufacturers are anticipating quite an easy time in filling their contracts. The lessened munition demand and the availability of nitrate of soda, especially on the Pacific Coast, will probably ease the situation materially, and may even lead to an exportable balance. The British manufacturer, therefore, cannot afford to lose any time in looking after some of his pre-war customers.

Quality of Gas at Alfreton.—At a meeting of the Alfreton Urban District Council, a letter was read from the local Gas Company in regard to the Council's complaints as to the poor quality of the gas supplied to the town. In this, the Company admitted there was just cause for complaint, owing to the coal shortage; but they stated that they had made arrangements which they hoped would prevent future complaints.

Fire at Old Kent Road.—Considerable damage was done by fire last Thursday to the upper part of a two-floor building used as a gas-stove store at the Old Kent Road works of the South Metropolitan Gas Company. The staff set to work with two private hydrants, and on the arrival of the brigade another hydrant was used with good effect. The firemen devoted their efforts to preventing the fire from reaching one of the holders, which was close to the building.

Derby Gas Company.—The report of the Directors states that the profit for the past year was £32,732, against £38,773; the decrease being accounted for by the advanced price of coal and material and the cost of labour, which compelled the Board to increase the charge for gas by 6d. per 1000 c.ft. as from June. The quantity of gas sold was greater than in any previous year since the Company was formed 99 years ago. To meet the continual increase, additional plant is being erected at the Litchurch works, the first section of which was brought into operation in December. For modernizing the whole of the works, £10,000 has been appropriated out of the revenue account during the year. An interim dividend of 5 p.ct. per annum for the half year ended June has already been paid, and the standard dividend on the consolidated stock at the rate of 5 p.ct. per annum for the past six months is recommended, with an additional ¼ p.ct. for the whole year, making 5¼ p.ct., less tax.

SAWER & PURVES,

THE POSITIVE DRY PREPAYMENT METER

MANCHESTER & NOTTINGHAM.

Peat-Coke and Oil Syndicate, Ltd.—Resolutions have been passed that it is desirable to reconstruct the Syndicate, and accordingly that it be wound up. There is to be registered a new company, to be named the Coal Peat Coke and Oil Company, Ltd.

Bournemouth Gas Company's Bill.—At a meeting last Tuesday of the Bournemouth Town Council, the Clerk was instructed to deposit a petition against the Bill, and to take all such other proceedings as he may deem necessary for the protection of the Council's interests, including the engagement of an expert engineer and accountant. The Poole Town Council the same day adopted a recommendation as to the engagement of a gas engineer to advise the Corporation upon the Company's proposals.

The National Benzol Company, Ltd., was registered on Feb. 1, with a nominal capital of £1000, for the purpose of carrying on the business of manufacturers and preparers of, and dealers in, benzol and its homologues, and all kinds of oil (mineral, animal, or vegetable), creosote, pitch, tar, and similar materials, and all chemical substances and materials necessary or useful therefor, or connected therewith. One of the signatories is Mr. J. E. C. Lord, Manufacturing Chemist, of Weaste, Manchester.

Tottenham District Light, Heat, and Power Company.—The accounts for the past half year show a profit of £10,384, after meeting the usual fixed charges. The Directors recommend the payment of the full statutory dividends at the rate of 5 p.ct. per annum on the preference stock; 4½ p.ct. per annum on the "A" stock; and 3 p.ct. per annum on the "B" stock—all less income-tax. The sum required is £10,604, and reduces the carry forward by £220, to £4169. The meeting of proprietors takes place next Saturday.

Walker and Wallsend Gas Company's Increase.—At the annual meeting next Friday, the Directors will report that the revenue for the year ended Dec. 31 was £82,167, and the expenditure £73,300, leaving a balance of £8867 as the profit for the year. This, with the undivided profits, makes a sum of £20,569, for the payment of interest and preference dividends, and dividends of 4½ and 5¾ on the ordinary stocks, which the Directors propose to distribute. The revenue account for the year shows an increase in the receipts of £15,076, and in expenditure of £14,786. The quantity of gas sold was 13·47 p.ct. more than the previous year. The manufacturing plant being now fully employed, additional extensions are expedient; and the Directors are making the necessary arrangements.

STOCK MARKET REPORT.

THINGS on the Stock Exchange for the most part went decidedly better last week, in spite of the stirring times through which we are passing; and it was a significant indication of the internal strength of markets, and of the calm good sense of people in general, that there was nothing panicky or precipitate in the movement even when some lines did go a bit easier.

The gilt-edged division even showed improvement. In Home Government issues, War Loans were generally firm, and the 5 p.ct. closed at better than 95. Consols were rather variable; but they marked 59¼ on Friday. Indian issues, however, were out of favour. Home Rails had a nice recovery from the depression of the week before, in response to the cheering influence of good dividend announcements; and if a definite stop can be put upon unauthorized strikes in defiance of the Union leaders, they ought to go still better. Canadians showed improvement, and Argentines were fair. The Foreign Market showed some good points. French Loans were firm, and Spanish, Chinese, and Japanese in some request; but Russians remained dull. In Miscellaneous, Oil was very strong, though the rising prices at last induced some realization of profits; and Insurance shares were in great request.

Business in the Gas Market was very quiet; there being a considerable falling off in the aggregate number of recorded transactions. Gas Light and Coke and Imperial Continental presented only a moderate array; while as for the rest, they were in most instances only pecked at in the form of a single bargain. Quotations were almost unchanged. Only Gas Light ordinary was a point easier; and Alliance and Dublin was put at 48-50. West Kent stock, having been converted into South Suburban ordinary, now disappears from the list as a separate quotation.

Bargains done for cash during the week were as follows: On Monday, Continental Union preference 72½, Gas Light ordinary 68½, 69, 69¼, 69⅜, 69⅝, ditto debenture 57, Imperial Continental 118½, 119, 119¼, 119½, 119⅝, Primitiva preference 62s., South Metropolitan 73, 73½, Richmond 49½, 49¾. On Tuesday, Brighton and Hove ordinary 98, Gas Light ordinary 68, 68¼, 68½, 68⅝, 68⅞, 69½, ditto maximum 56½, ditto preference 72, ditto debenture 57⅛, Imperial Continental 119, 119½, ditto debenture 73⅞, 74, North Middlesex 10¼, Primitiva preference 60s., South Metropolitan 73⅝, 74. On Wednesday, Alliance and Dublin 49⅜, Commercial 4 p.ct. 64, ditto 3½ p.ct. 61½, Gas Light ordinary 68¼, 68⅜, ditto debenture 56¾, Imperial Continental 119¾, North Middlesex 10⅛, 10¼, Primitiva preference 60s., South African 13, South Suburban debenture 90½. On Thursday, Gas Light ordinary 68¼, 68½, 68¾, ditto debenture 57½, Imperial Continental 119, 119¾, 120, Monte Video 9⅜, Primitiva preference 60s., ditto debenture 75⅜, 75½, South Metropolitan 74. On Friday, Gas Light ordinary 68¾, 69, Imperial Continental 118½, 120, North Middlesex 10⅜, Primitiva debenture (1911) 46½, South African 13¼.

In the Money Market, there was at first a large demand, succeeded by marked ease and subsequent alternations. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	62—67	..
1,551,868	"	April 8	2½	4⅜%	Alliance & Dublin Ord.	59—64	48—50	49⅜
374,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	61—68	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5½—6¾	5¾—6½	..
50,000	10	Feb. 26	15	11%	Bournemouth Gas and Water — 10 p.c.	25—30	22—24	..
388,110	10	"	7	7%	Bournemouth Gas and Water — B 7 p.c.	15—15½	10½—11½	..
115,000	10	"	6	6%	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	9¾—9⅞	..
159,740	—	—	—	4%	Bournemouth Gas and Water — 4 p.c. Deb.	..	66—68	..
992,045	Stk.	Feb. 26	14	4⅜%	Brentford A Consolid.	261—266	78—81	..
734,920	"	"	11	4⅜%	Do. B New	204—209	72—77	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	77—82	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	62—64	..
217,880	"	Feb. 26	11	8¼%	Brighton & Hove Orig.	208—218	140—145	
244,200	"	"	8	5¾%	Do. A Ord. Stk.	154—159	97—102	98
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	22/6	British	44—45	31½—32½	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—53	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	3⅜—4¼	..
100,000	10	—	—	4¼%	Do. 4½ p.c. Pref.	4—6	7⅛—8½	..
100,000	Stk.	June 26	4½	4¼%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,618,280	"	Feb. 12	5/9/4	86/-	Commercial 4 p.c. Stk.	108—108	62—67	64
660,000	"	"	5⅓	80/-	Do. 3½ p.c. do.	103—105	58—63	61½
475,000	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	48—53	..
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	72½
51,600	Stk.	Aug. 29	14½	13⅛%	Croydon A 10 p.c.	..	160—170	..
278,400	—	"	11½	10⅓%	Croydon B and C 7 p.c.	..	135—140	..
492,270	Stk.	—	6	5⅓%	Derby Con. Stk.	128—125	95—100	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	80—88	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	13—14*	..
16,398,975	Stk.	Feb. 10	4/17/4	29/4	Gas and Light and Coke — 4 p.c. Ord.	98—102	68—70	68—69⅞
2,600,000	"	"	8½	8½%	Gas and Light and Coke — 8½ p.c. max.	76—79	56—58	56⅝
4,062,285	"	"	4	4%	Gas and Light and Coke — 4 p.c. Con. Pref.	96—99	70—73	72
4,674,850	"	June 11	8	8%	Gas and Light and Coke — 8 p.c. Con. Deb.	73½—74½	56—58	56⅞—57½
180,000	"	"	10	10%	Gas and Light and Coke — 10 p.c. Bonds	..	..	..
82,500	"	Mar. 12	5	4⅛%	Hastings & St. L. 5 p.c.	..	60—65	..
258,740	"	—	8½	2⅛%	Do. 3½ p.c	87—89	45—50	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7⅞—8¾	..
86,600	Stk.	Sept. 12	9	9%	Hornsey 7 p.c.	..	117—122	..
181,000	"	Mar. 12	7½	6⅛%	Ilford A and C.	151—154	92—97	..
65,780	"	"	6⅔	4⅜%	Do. B	115—118	70—75	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	117—122	118½—120
1,225,000	"	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	73—74	73½—74
285,242	"	Mar. 12	6⅔	6⅔%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	"	Feb. 26	10	5%	Liverpool 5 p.c. Ord. A	211—218	82—84	..
					Liverpool 5 p.c. Ord. B	146—148		
806,088	"	June 26	4	4%	Do 4 p.c. Pr. Deb. Stk.	..	71—73	..
165,736	"	Aug. 15	4½	4½%	Maidstone 5 p.c.	..	60—65	..
75,000	5	June 11	6	8%	Malta & Mediterranean	4½—4¾	3½—3¾	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	90—97	..
541,920	20	May 26	4	6/-	Monte Video, Ltd.	11½—12	9½—9⅞	9¾
1,875,892	Stk.	July 29	4½	8½%	Newcastle&Gatsh'd Con.	98½—99½	72—73	..
539,795	"	June 26	8½	8½%	Do. 8½ p.c. Deb.	82—88	57—59	..
55,940	10	Feb. 26	7/14/0	7%	North Middlesex 7 p.c.	14—15	9¾—10½	10⅛—10⅜
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	108—105	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4—5	..
60,000	50	Feb. 26	18	9%	Portsea, Island B	128—131	78—88	..
100,000	50	"	12	8%	Do. C	118—121	60—65	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅜—2½	..
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4¾—5	3—4⅛	60/—62/-
631,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	74—76	75⅜—75½
600,000	Stk.	July 31	4	4%	Do. " 1911	..	46—49*	46½
946,198	"	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/	San Paulo (5 p.c. Pref.	10½—11	7⅜—8¼	..
125,000	50	July 1	5	5%	San Paulo (5 p.c. Deb.	47—49	40—42	..
185,000	Stk.	Mar. 12	10	10%	Sheffield A	228—224	170—178	..
209,984	"	"	10	10%	Do. B	229—224	170—178	..
598,500	"	"	10	10%	Do. C	220—229	168—170	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	May 26	9	6/-	South African	10½—11½	13—14	13—13½
6,609,895	Stk.	Feb. 10	5/4/0	82/-	South Met. 4 p.c. Ord.	111—118	73—75	73—74
250,000	"	July 12	—	5%	Do. Pref.	..	92—94	..
1,895,445	"	July 10	8	8%	Do. 3 p.c. Deb.	73½—74½	54—56	..
224,890	"	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	114—116	..
959,795	"	"	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	77—80	..
60,000	"	"	5	5%	Do. 5 p.c. Pref.	110—112	75—78	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	89—93	90½
647,740	"	May 14	5	3%	Southampton Ord.	99—102	67—70	..
120,000	"	Feb. 12	7½	5⅓%	Tottenham District (A 5 p.c.	135—138	92—97	..
782,275	"	"	6	4%	Tottenham District (B 5½ p.c.	115—117	67—69	..
181,255	"	June 26	4	4%	Tottenham District (4 p.c. Deb.	87—89	64—66	..
129,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
286,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109	87—88	..
80,000	"	Feb. 26	8⅜	68/9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	90—95	..
256,686	"	"	6¾	48/9	Do. B 5½ p.c.	129—134	70—75	..
852,000	"	"	6⅜	42/6	Wimbledon 5 p.c.	117—122	70—75	..
98,000	"	"	6¾	48/9	Epsom 5 p.c.	121—126	72—77	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	68—69	50—52	..

* *Ex div.*

Yearly Meetings at Dorchester.—It is proposed by the Directors of the Dorchester Gas and Coke Company, Ltd., to hold a general meeting and publish the statement of accounts yearly in future, instead of half yearly, paying an interim dividend in August. In submitting the accounts for the past six months, they point out that there has been a slight reduction in the consumption, entirely due to the Household Fuel and Lighting Order. At to-day's meeting, the payment of dividends at the rate of 8 p.ct. on the ordinary capital (less income-tax) is recommended.

South Staffordshire Mond Gas Company.—At the eighteenth ordinary meeting of shareholders next Tuesday week, the Directors of the South Staffordshire Mond Gas (Power and Heating) Company will submit the accounts for the year 1918. There is a gross profit of £18,232, as compared with £10,447 for the previous year, or an increase of £7785. Deducting bank and debenture interest, a net profit remains of £9867, which added to the £6062 brought forward makes the total standing to the credit of the profit and loss account £15,929. In view of the amount of the bank overdraft and the serious times ahead, it is proposed to pay the preference dividend for 1917 only, and to carry forward £10,979. Owing to shortage of material and labour less fuel was gasified; and nearly 11 p.ct. less gas sold, during the year than in 1917. Until November, the demand constantly exceeded the supply. The continued inferiority of fuel supplies kept the yield of sulphate of ammonia down.

The gas department's share in the proposed urgency expenditure at Leeds, in reply to inquiries by the Local Government Board, is the reconstruction of the water-gas plant at Meadow Lane and the erection of an additional machine, £28,000, and the purchase of the benzol plant at New Wortley, £10,000.

Estimates presented to the Hull Gas Committee figure a net profit of £1195 on their gas undertaking for the year to March 31, 1920.

Edwin Hodgkinson, a chemist at St. Helens, was found dead in bed at the house of his parents. A gas-tap was turned on, and a tube was connected to the bracket.

Oil has been reached at Brimington by borings by the Government in the Derbyshire coalfields. Boring is being carried on, chiefly by American experts, at six centres in Derbyshire.

The Gas Committee of the Inverness Town Council are inquiring for a site on which to erect new vertical retorts, &c., with a view to securing direct communication with the railway.

The notices to enforce a demand of the shift workers at the Mond Gas Company's works, Dudley Port, for eight hours per day instead of twelve, without financial reduction, coupled with overtime after 56 hours, pending the engagement of an extra shift, have been withdrawn. The matter is to be settled by arbitration.

The Stafford Corporation Gas Committee have received a letter from the Ministry of Munitions expressing their appreciation of the services of the Gas Engineer (Mr. W. M. Valon) as a member of the Technical Advisory Committee established by the Ministry in connection with the manufacture of sulphate of ammonia.

A Special Sub-Committee of the Bradford Corporation has reported in favour of arrangements to enable suitable young people to be trained for the various departments of municipal service. The conditions recommended, under which pupils would be articled or indentured in the departments, include that, as a beginning financial support shall be provided by means of a contribution of £100 a year from the Gas, Electricity, Water, Finance, and Conditioning House Committees, who have power to devote surplus profits to the general benefit of the inhabitants.

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SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, Nov. 19, p. 401.

"FERROX." "FERROX." "FERROX."

A BRITISH Oxide Cheaper and Better than Bog Ore. 85 per cent. Water, 75 per cent. Ferric Hydrate.
For Sale outright or on Loan.
OXIDE LIMITED, Brentford, MIDDLESEX.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, ROSE MOUNT IRONWORKS, ELLAND.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzo, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

EXTENSIONS.—Gas-Works requiring Alterations or Additions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, 15, Park Row, Leeds, who make a Speciality of Gas Apparatus, Coke-Oven Plant, and Structural Steel Work. Inquiries Solicited. Satisfaction Guaranteed. Telephone No. 22579, LEEDS.

APPOINTMENTS, &c., WANTED.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualification being equal, has the FIRST CALL ON YOUR CONSIDERATION.

GAS Engineer, at present Works Manager of Large Modern Works (3¼ Million per diem), Desires Position as ENGINEER, or as ASSISTANT ENGINEER, of a Large Works, or as WORKS MANAGER or SUPERINTENDENT with prospect of Promotion. Colonial or Foreign Appointments considered. Wide Experience. Exceptional Technical Qualifications, Science Degree Medalist, &c. Highest References.

Inquiries, in confidence, to No. 6582, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

TO Fire-Clay Retort and Brickmakers and Gas Engineers.—TRAVELLER, with Good Connection among Gas Companies, is OPEN TO AN ENGAGEMENT. No objection to part Office Work.

Address No. 6590, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

OFFICER, shortly Demobilized, desires Position as SECRETARY or CHIEF CLERK to a Gas Company. Rural District, Midlands preferred. Highest Qualifications, Ten Years Chief Clerk 45 million Works, and holds important Commercial Diplomas.

Address No. 6591, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

APPOINTMENTS, &c., VACANT.

SEAFORD GAS COMPANY, LIMITED.

ENGINEER AND MANAGER.

APPLICANTS Thanked, Position FILLED.

Seaford,
Feb. 6, 1919.

WAREHAM (DORSET) GAS-WORKS.

MANAGER Wanted immediately for above Works. Must be good Carbonizer and Practical Fitter, able to Take Entire Local Charge. Annual make, 7½ millions. House on Works, Coal, and Gas Free.

State Age, Wages, and Experience, with *copies* of Testimonials, to SAML. WHILE & SON, 60, QUEEN VICTORIA STREET, E.C. 4.

QUAKER'S YARD GAS AND WATER COMPANY, LTD.

WANTED—Gas Engineer, to act as MANAGER and SECRETARY. Salary, £250, with Annual Increments of £10 up to £300. House, Coal, and Gas provided.

Applications, stating full Particulars and previous Experience, and enclosing Two recent Testimonials, to be sent by the 20th inst. to the CHAIRMAN, Dr. Leigh, GLYNBARGOED, TREHARRIS, GLAM.

STRETFORD GAS COMPANY.

ASSISTANT Gas Engineer Required. Apply, not later than Feb. 22, giving full Particulars, Age, Education, Mechanical and Technical Training, &c. Salary and References, to H. KENDRICK, Engineer and Manager, GAS-WORKS, STRETFORD, near Manchester.

THE Portsea Island Gas Light Company invite Applications for the Position of ASSISTANT ENGINEER and CHIEF DRAUGHTSMAN, at a Commencing Salary of £375 per Annum.

Applications, giving Age, full Particulars of Training, and Experience, including Distribution, and accompanied by not more than Three recent Testimonials, to be addressed to the Chairman, endorsed "Assistant Engineer," not later than Tuesday, Feb. 11 next.

H. A. STIBBS,
Secretary.

Chief Offices,
Town Hall Square,
Portsmouth.

DRAUGHTSMAN.

A LARGE Gas-Works in the North of England require the Services of a Competent DRAUGHTSMAN. Should be capable of Working Out Strains and Stresses and Making the Necessary Estimates for a large Scheme of Extensions. Salary, including Bonus, about £270 per Annum.

Applications, giving full particulars of Age, Experience, and enclosing *copies* of not more than Three recent Testimonials, to be made to No. 6587, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED—A Well-Trained Chemist and to ASSIST GENERALLY for a Gas Company whose Works are situated in the Thames Valley. Annual make, about 400 Million C.ft.

Applicants must state Experience, and give Age and Salary required, to No. 6595, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED — Well-Trained Chemist, able to assist Manager, for a Bye-Product Coking Plant. Good Prospects for a Keen Worker.

Apply, by letter, stating Experience and Salary required, to No. 6594, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

COKE Oven and Bye-Product Plant SUPERINTENDENT wanted for Colliery Installation near Glasgow. Thoroughly Experienced Man.

State full Particulars, Age, Experience, Testimonials, and Terms, to No. 6593, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

TECHNICAL Assistant required for Attending at Gas and Other Works for Fitting-up and Adjusting Testing Instruments. Must be well up in Physics and able to Act as Responsible Representative. Ample Preliminary Training will be given.

Apply, by letter, WRIGHT, 1, WESTMINSTER PALACE GARDENS, S.W. 1.

WANTED — for Gas-Works in the Metropolitan Area, a CARBONIZING FOREMAN with Experience of Inclined and Vertical Retorts. Carburetted Water-Gas Plant. Eight-Hour Shifts. Three Weeks' Summer Holiday with Pay, after Twelve Months' Service. Wages to commence, £3 17s. 5d. (including War Wage), *plus* 12½ p. ct. Bonus, per Week.

Applications, by letter, stating Age, Experience, &c., with References, to be sent to No. 6575, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

RETORT-HOUSE FOREMEN.

WANTED for a Large Undertaking in the North of England, an efficient RETORT-HOUSE FOREMAN. Must be accustomed to Regenerative Settings, the Working of Carburetted Water-Gas Plant, and Electrical Driving of Coal and Coke Conveyors. Wages, including Bonus, average £4 12s. 1d. per Week.

Applications, by letter, giving Particulars of Age, Experience, and enclosing not more than Three recent Testimonials, to No. 6584, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

NIGHT Foreman Wanted for Private Gas-Works in North London. Must be a Good Carbonizer, thoroughly used to all Gas-Works Plant, a Good Manager of Men, Honest, Industrious, and Fully Trustworthy.

Apply, by letter, with full Particulars and Wages required, to No. 6592, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

GAS-FITTER and Service Layer Wanted with all-round Experience. Wages, including War Wages, £3 5s. per Week of 49½ Hours.

Apply, stating Age and Experience, to H. BURTON, Engineer and Manager, GAS-WORKS, SHIPLEY.

WANTED—a Gas-Fitter well up in Iron and Compo Work and able to do Main and Service Laying.

Apply, Stating Age, Experience, and Wages required, enclosing References, to E. A. BUCKLEY, Manager, GAS-WORKS, HOLMFIRTH.

PLANT, &c., FOR SALE & WANTED.

FACTORY Premises required between now and July, 1920, about 12,000 feet, within 20 miles of Charing Cross—South or West. Scientific Instrument business.

Address No. 6589, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED.—Coal Tar, filled into Buyers' Casks, Kent, Surrey, or Sussex, or in Tank Wagons any reasonable distance.

W. JOHNSON, JUNR., Tar Distiller, NEW HYTHE, LARKFIELD, KENT.

WANTED, Second-Hand, Eight-Way "Weck" CENTRE VALVE for 18-in. Diameter Connections, or nearest size. Must be in good Working order.

Price, with Full Particulars and Sketch, to the ENGINEER, Hendon Gas-Works, SUNDERLAND.

THE Sheffield Gas Company have for Disposal Two WEST'S COMPRESSED AIR CHARGING MACHINES suitable for Charging Retorts Four Tiers High.

Full particulars may be obtained from W. H. JOHNS, Engineer, GAS OFFICES, SHEFFIELD.

TWELVE-TON Acid Tank Wagon for HIRE.

For Terms, apply to FREDERICK G. HOLMES & Co., LTD., Thames Tar Works, Lower Road, NORTHFLEET, KENT.

ONE Waller 75,000 c.ft. per Hour Four-Bladed EXHAUSTER, Complete with STEAM ENGINE, Direct Coupled, Screw-Down Valves, &c.

Address No. 6588, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

A DISUSED Three-Lift Frame-Guided GASHOLDER of Approximately 120,000 c.ft. Capacity, in Sound Condition. Resheeted by Piggotts in 1909. Lifts, 55 ft. 6 in., 57 ft., and 58 ft. 6 in. by 18 ft. respectively.

Two 15,000 c.ft. per hour Two-Bladed Gwynne's EXHAUSTER DRUMS only, with Couplings and 8 in. Screw-Down Valves. In Excellent Condition.

RETORT BENCH IRONWORK, Including Tangye 21 in. by 15 in. ⌀ Mouthpieces, 6 in. ASCENSION, ARCH, and DIP PIPES, STEEL HYDRAULICS, &c., from Four Settings of Six Retorts.

All of which may be Inspected on Application to the REDDITCH GAS COMPANY.

PURIFIERS.—Set of Four or Six 22 ft. square by 5 ft. deep. Perfect Condition.

Set of Four, 10 ft. square, by 4 ft. 6 in. deep.

FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, *vid* LEEDS.

STATION Meter, Rectangular, 20,000 c.ft. per hour capacity, 12 in. Bye-Pass. Very Good Condition.

FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, *vid* LEEDS.

GASHOLDER.—95,000 c.ft. capacity, with STEEL TANK. Good Condition. Also Smaller Sizes.

FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, *vid* Leeds.

GAS PLANT for Sale.—We can always offer New and Second-Hand Gas Apparatus, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.

FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, near LEEDS.

BY ORDER OF THE ADMIRALTY.

NEW GASHOLDERS FOR SALE.

MESSRS. SAML. CUTLER & SONS, LTD., are instructed to receive OFFERS, on behalf of the Lords of the Admiralty, for the Purchase of Several New GASHOLDERS Ready for Immediate Erection.

For Particulars, see Double-Page Advertisement on pages II. and III. in Centre of this issue.

Plans and Specification on Application to SAML. CUTLER & SONS, LTD., 39, VICTORIA STREET, LONDON, S.W. 1.

CONTRACTS OPEN.

HAWORTH URBAN DISTRICT COUNCIL.

THE above Council are prepared to receive TENDERS for the Purchase of their Surplus TAR and LIQUOR for the Year ending 31st March, 1920.

Tenders should be sent to me not later than Monday, the 24th inst.

No Special Form of Tender.

W. ROBERTSHAW,
Clerk.

North Street,
Keighley.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Purchase and Removal of the GAS TAR to be produced at the undermentioned Works during a period of One Year commencing at noon on the 31st of March, 1919—viz.:

Rochdale Road Gas-Works	Coal-Gas Tar
Gaythorn Gas-Works	Coal-Gas Tar
Droylsden Gas-Works	Coal-Gas Tar
Bradford Road Gas-Works	Coal-Gas Tar
do.	Carburetted Water-Gas Tar

Full Particulars and Tender Forms may be obtained on written application to Mr. Fredk. A. Price, Superintendent of the Gas Department.

Sealed Tenders, addressed to the Chairman of the Gas Committee and endorsed "Tender for Gas Tar," must be Delivered at the Offices of the Gas Department, Town Hall, Manchester, before 10 a.m. on Thursday, the 13th day of March, 1919.

The Committee do not bind themselves to accept any Tender, and reserve to themselves the right to divide any offer as they may deem advisable.

By order,
(Signed) THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester,
Feb. 4, 1919.